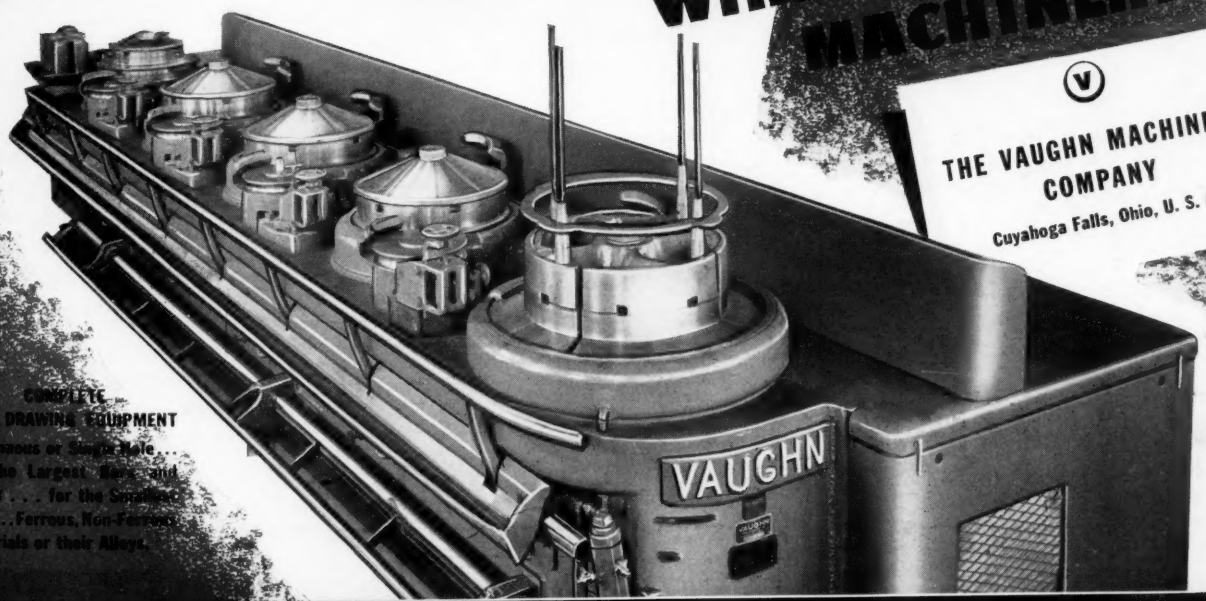
WIRE AND WIRE PRODUCTS

FEBRUARY 1944

A MAJOR FACTOR
in BETTER and FASTER
Wire Production
NOW . . . AND LATER, TOO!

Vaughn
WIRE DRAWING MACHINERY



THE VAUGHN MACHINERY COMPANY
Cuyahoga Falls, Ohio, U. S. A.

COMPLETE
LD DRAWING EQUIPMENT
ntinuous or Single Hole...
the Largest Bars and
es . . . for the Smallest
re . . . Ferrous, Non-Ferrous
terials or their Alloys.

OFFICIAL PUBLICATION OF THE WIRE ASSOCIATION

Combined Operations

WILSON RECTANGULAR AND CIRCULAR BELL TYPE FURNACES FOR ROD AND WIRE COIL ANNEALING

Rectangular Furnaces with three and four stack bases with recirculating fan under each pedestal. For large tonnages of the same analysis.

Circular Furnaces for single stack loading. For wider flexibility in production planning and customers service.

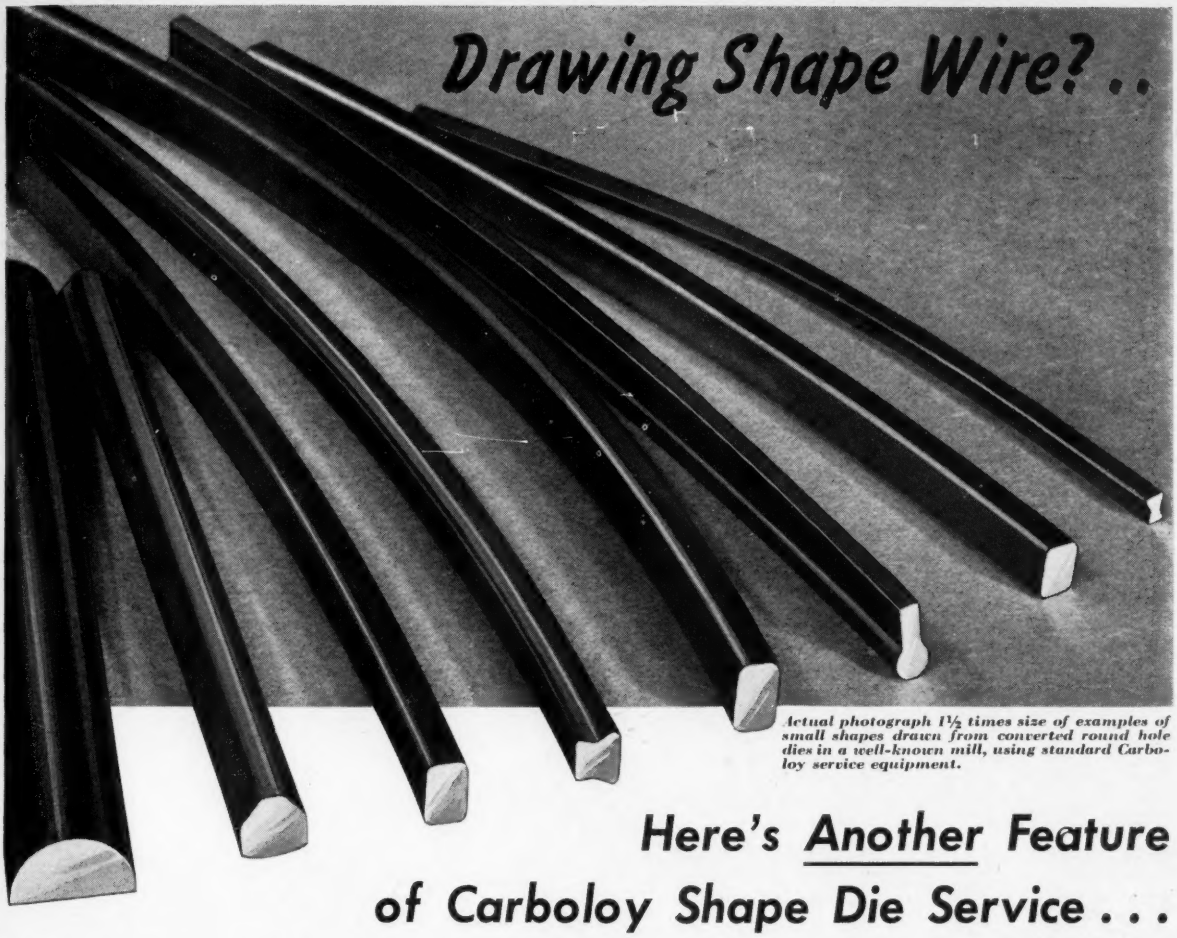
This installation of four Rectangular Bell Furnaces and nine bases and three Circular Bell Furnaces and eight bases recently completed at one of the newest large wire mills enables the production department to utilize the best advantages of both types.

Engineered and Constructed by

LEE WILSON ENGINEERING
Company, Inc.

20005 WEST LAKE ROAD
Cleveland, Ohio . . . ACademy 4670

INDUSTRIAL FURNACES ★ RADIANT TUBE HEATING ★ HEAT TREATING PROCESSES



Actual photograph 1½ times size of examples of small shapes drawn from converted round hole dies in a well-known mill, using standard Carboloy service equipment.

Here's Another Feature of Carboloy Shape Die Service . . .

Carboloy Service to mills drawing shaped wire is a *complete* service covering not only dies for every application but also standard Carboloy-developed equipment for finishing and servicing, and comprehensive training of your die room personnel. Training service includes service in your mill as well as factory-training courses available to your men, without charge, at our plant.

A special feature now being utilized by a number of mills is the conversion of standard round hole Carboloy Dies to use for drawing shapes in fine wire sizes. By this method, these mills are able to quickly get special shapes on the job and often find it possible to obtain extra service from round hole dies after original use.

Try this service—as one part of the following three-way plan to cover *all* your carbide shape die requirements:

1. SQUARES AND HEXAGONS: Obtain *standard* rough cored shapes and finish in your die room.
2. LARGE SPECIAL SHAPES: Obtain special rough shaped dies close to size. Quickly finish in your die room.
3. SMALL SPECIAL SHAPES (Fine Wire Sizes): Convert standard round hole Carboloy Dies to your special requirements, using standard Carboloy Shape-Die Equipment.

Ask your Carboloy representative for full details.

CARBOLOY COMPANY, INC.

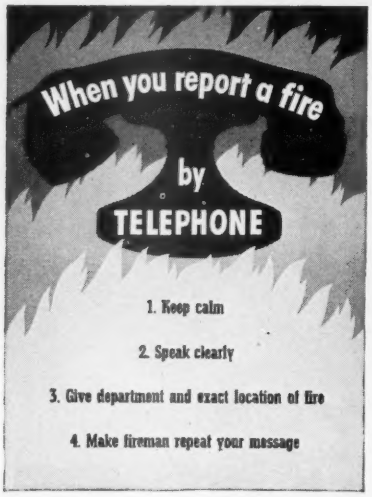
11171 E. Eight Mile Avenue, Detroit 32, Michigan

Birmingham · Chicago · Cleveland · Los Angeles · Newark · Philadelphia · Pittsburgh · Seattle · Thomaston, Conn.

Authorized distributors: Hartley Wire Die Co., Thomaston, Conn.; Michigan Wire Die Co., Detroit, Mich.

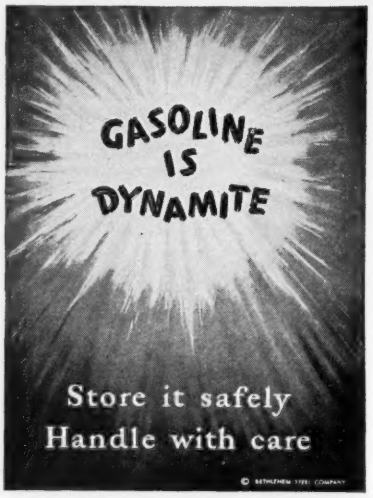
CARBOLOY TRADEMARK **CEMENTED CARBIDES** TRADEMARK

COMPLETE DIE SERVICE FOR WIRE, BAR, TUBING AND SHEET METAL



COME ON ED— STOP DAY-DREAMING IN FRONT OF THAT POSTER
THIS IS NO DREAM IT'S GOOD STUFF TO KNOW
HOW TO USE A FIRE EXTINGUISHER
MOTORS THROWIN' SPARKS ...BETTER SHUT DOWN!
LOOK OUT, ED— SHE'S ON FIRE!
THAT DAY-DREAM KIND OF PAID OFF ... HUH, BILL?

fighting fires with



POSTERS

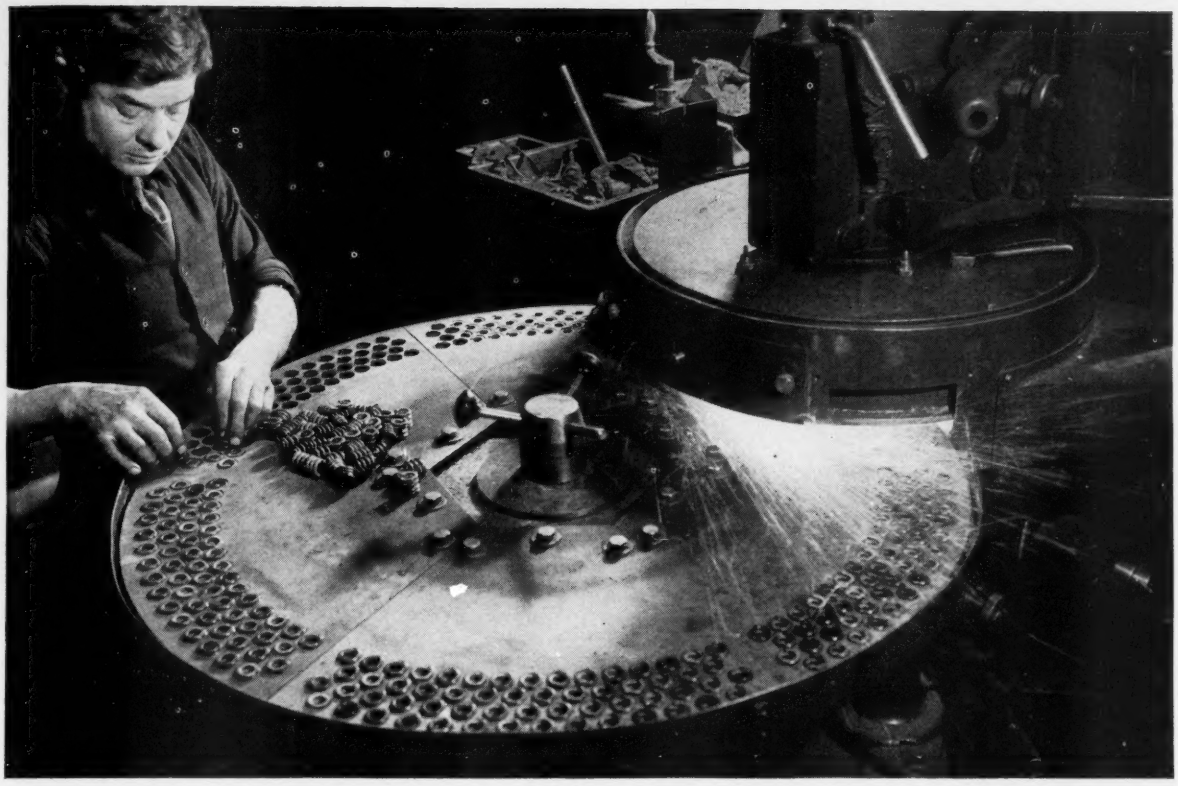
Bethlehem has long had an efficient fire-fighting organization. But war conditions multiply normal fire hazards. Thousands of new employees have come to work. Large additions have been made to existing facilities, and entire new departments set up. At the same time, war needs have intensified the pressure for production.

Since the start of the war emergency Bethlehem has redoubled its effort to keep down production loss due to fires. Much new equipment has been provided: extinguishers, alarm boxes, sprinkler systems, hose outlets and fire engines. And as plants grew, fire-fighting personnel was expanded, and given special training.

A poster campaign, of which a few representative samples are shown on this page, is one important detail of this program. Each poster registers in the employee's mind a single, specific point in fire-fighting or fire-prevention. Prominently displayed in steel plants, shipyards, fabricating shops, these posters are helping to maintain a favorable fire-loss record through the war years.

A fire on the production front can cost American lives on the battle-fronts. Even seemingly trivial fires have a grave cumulative effect. The aim is to prevent fires from occurring at all—and, if they do occur, to make them die young.

BETHLEHEM STEEL



You Can Increase Spring Production

. . . with NORTON DISC WHEELS

The Norton line of disc wheels is completely described in the booklet "Disc Grinding—A Production Operation." Write for a copy. Just ask for Form 1141-WP.

ENGINEERED to the job — that's the reason for the success of Norton Disc Wheels in increasing spring grinding production. And they can be expertly engineered because of these Norton facilities:

1. Resinoid, silicate and vitrified bonds — whichever your particular job requires.
2. The patented Controlled Structure process of manufacture that assures uniformity throughout each disc and from disc to disc.
3. Segmental and solid type discs with mountings to fit all sizes and kinds of grinders.
4. Experienced engineers the country over to give expert help on disc wheel selection.

It will pay you to use Norton Discs on your spring grinding jobs.

NORTON COMPANY, WORCESTER 6, MASS.

Distributors in All Principal Cities

W-952

NORTON ABRASIVES

·MAKE YOUR RESERVATIONS NOW·

for the 1944 edition

of the

WIRE

& WIRE PRODUCTS'

Buyers Guide

and Year Book

of the

WIRE ASSOCIATION

The only reference book available listing all components of the wire industry, completely indexed.

Invaluable to purchasers of rod, strip, bare and covered wire and cable, cold drawn bars and cold headed products.

Gives sources of machinery, materials and equipment for manufacturers of rod, strip, wire and wire products.

Single copy price — $5.00

(A copy will be sent to each subscriber without additional cost.)

• ADVERTISE •

● ADVERTISING RATES ●

4 Pages	$250.00
2 Pages	160.00
1 Page	90.00
Second and Third Covers each	$150.00
One-half Page	60.00
One-quarter Page	35.00
One Inch	10.00
Back Cover	$175.00

• BE LISTED •

● SPECIAL OFFER ●

For $25.00 you can have as many bold face listings as you desire and three one-inch advertisements under or facing the headings you select. Full information will be supplied on request.

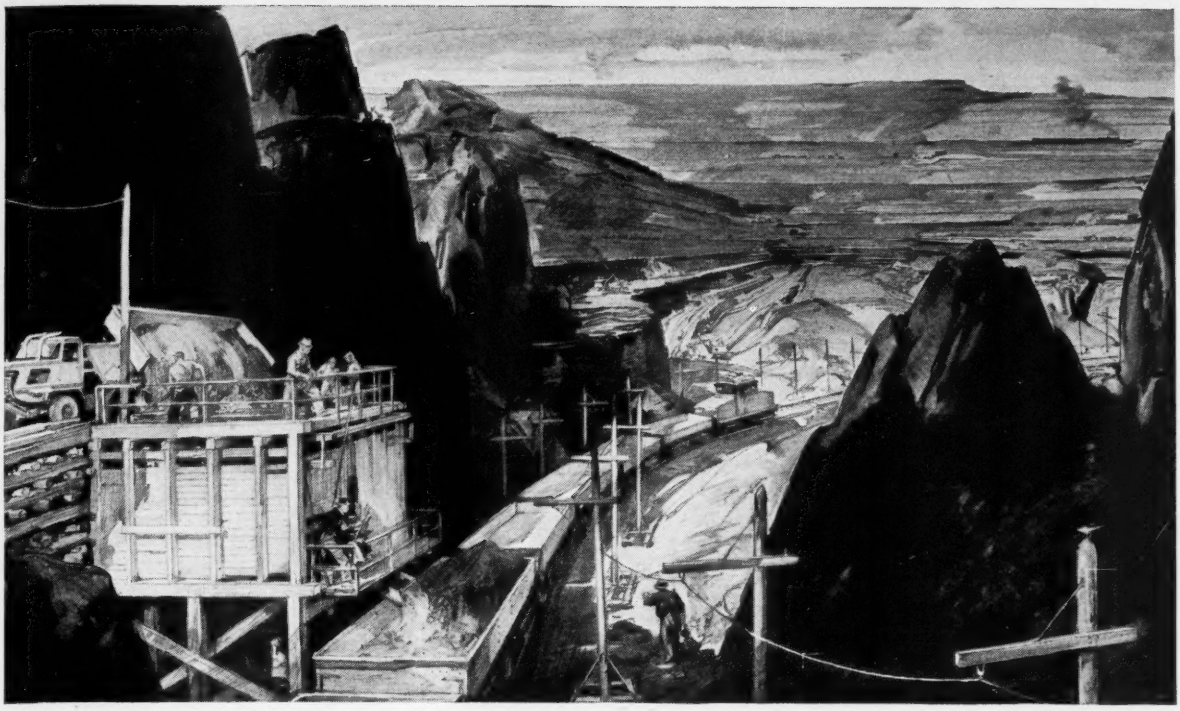
WRITE AT ONCE FOR FULL DETAILS

TO

WIRE & WIRE PRODUCTS

300 Main Street — Stamford, Conn.

OFFICIAL PUBLICATION OF THE WIRE ASSOCIATION



IRON ORE MINES—MOTHERS OF STEEL

The iron ore mines are mothers of steel—the metal with which the progress and prosperity of America have been achieved . . . its high standard of living attained.

From these iron ore mines began the great expansion of this country, the building of transcontinental railroads and telegraph systems, the growth of cities and towns, the development of steamship lines and telephone service, establishment of new industries—all providing more gainful employment—opening new avenues of opportunity.

With war, the iron ore mines are now the source of fighting steels—ninety million ingot tons in a year—to arm and equip our fighting forces.

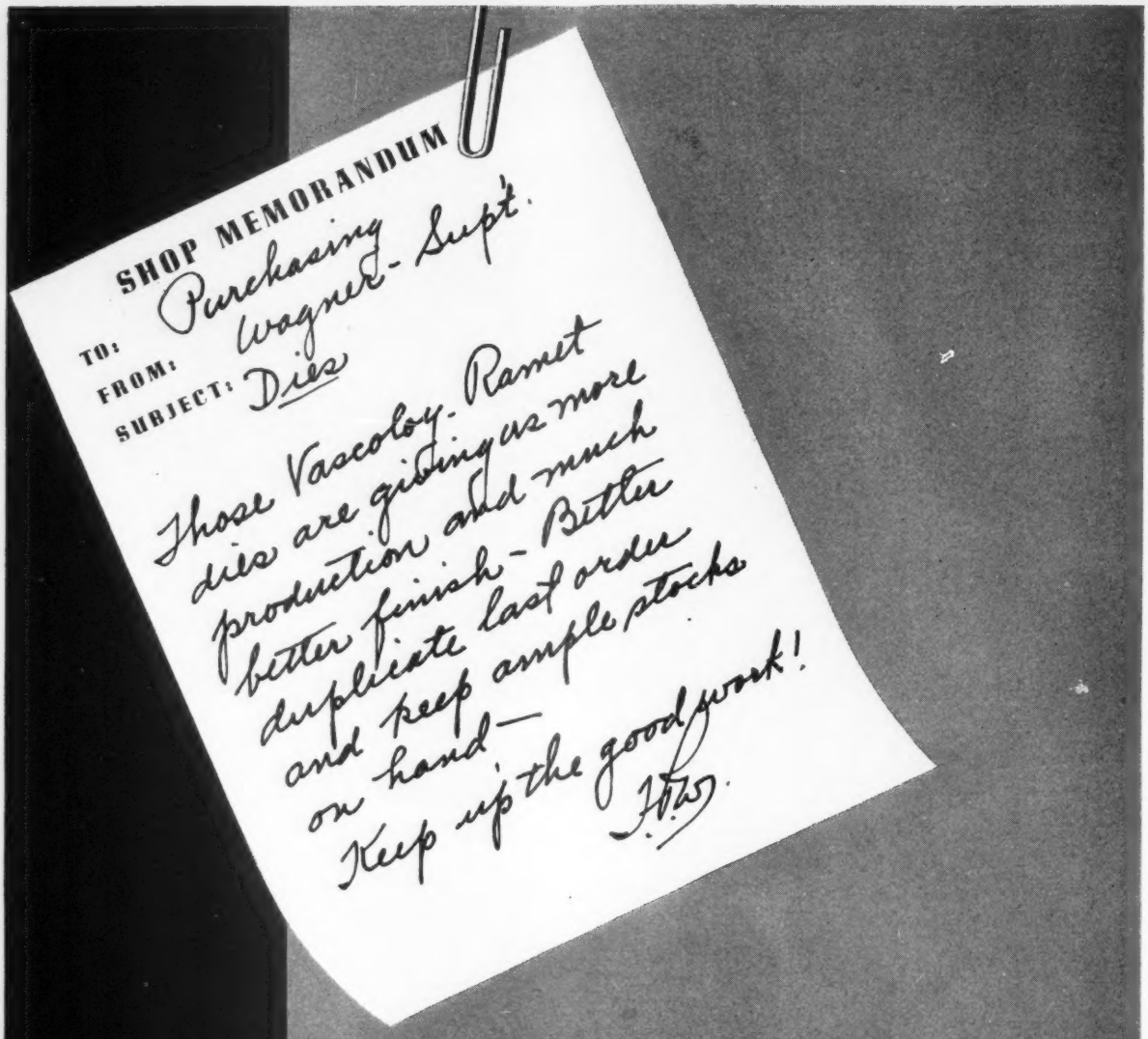
JONES & LAUGHLIN STEEL CORPORATION

PITTSBURGH, PENNSYLVANIA

J&L STEEL

CONTROLLED QUALITY STEEL FOR WAR

J&L STEEL


SHOP MEMORANDUM
TO: Purchasing
FROM: Wagner - Supt.
SUBJECT: Dies
Those Vascoloy-Ramet dies are giving us more production and much better finish - Better duplicate last order and keep ample stocks on hand—
Keep up the good work!
J.W.S.

TANTALUM-TUNGSTEN CARBIDE DIES produce more tonnage with better finish. Time spent in shut-downs for die changes, and for polishing and re-cutting dies—all affect production. Tantalum-Carbide has a definite lubricating action—it reduces the tendency of the wire or rod to gall and seize as it passes through the die. Result: A smoother finish free from score marks!

Makers of
VASCOLOY-RAMET
CARBIDE TOOLS &
TANTUNG CAST
ALLOY CUTTING TOOLS

Ramet
VASCOLOY RAMET CORPORATION
NORTH CHICAGO, ILLINOIS • DISTRICT SALES & SERVICE IN PRINCIPAL CITIES

Syncro offers...

portable power driven cut-off machines

THE Syncro ***portable*** power driven cut-off machine saves time and effort by enabling you to take the machine to the job—instead of taking the job to the machine.

A completely self-contained unit, this machine consists of a driving motor, control, an abrasive wheel connected to the driving motor with "V" belts and a coolant pump and reservoir, all mounted on a portable, roller bearing equipped hand truck.

The machine is available in two sizes. The 10 horsepower machine has a maximum capacity of 2" diameter material and the 20 horsepower machine has a maximum capacity of 3" diameter material. Standard machines are furnished with motors built for 220, 440 or 550 volt, 60 cycle, 3 phase current. Motors to operate on other voltages and cycles, or for direct current can be furnished to suit conditions.

The Syncro ***portable*** power driven cut-off machine can easily be moved to cabling machines in rope mills or to large supply reels in warehouses. It makes clean cuts without distortion of non-ferrous, soft or hardened materials, steel wire ropes or copper cables. In fact, this machine will cut all kinds and shapes of materials cleanly and quickly.

SYNCRO MACHINE COMPANY RAHWAY, NEW JERSEY McCORMICK BLDG., CHICAGO

REPRESENTED IN CANADA BY CANADIAN ELEVATOR EQUIPMENT CO. LTD., TORONTO

Machinery for the Wire Industry

SYNCRO

In case you think this is just steel wire . . .

● If the plans on your drawing boards call for wire in any form, and you are looking for a dependable source of supply for top quality wire and wire products—we can help you. Back of every coil or spool of WISSCO wire is a tradition of service. And whether your needs are small or for carload lots, our metallurgists and laboratories will be glad to cooperate in meeting your special requirements.

Our background of 123 years of research, discovery and pioneering has given us the "know-how" of making steel wire that is best for the purpose intended. And, since we operate our own blast furnaces, open hearths and wire mills, every step in manufacture—from ore pile to finished product—is made to meet your exact specifications.

★ ★ ★

Here at wire headquarters you'll find everything in wire: high and low carbon steel wire, round, flat or shaped, in a variety of sizes, tempers, grades and finishes. Put your wire problems up to experts. We can help find the answers to all sorts of wire applications.

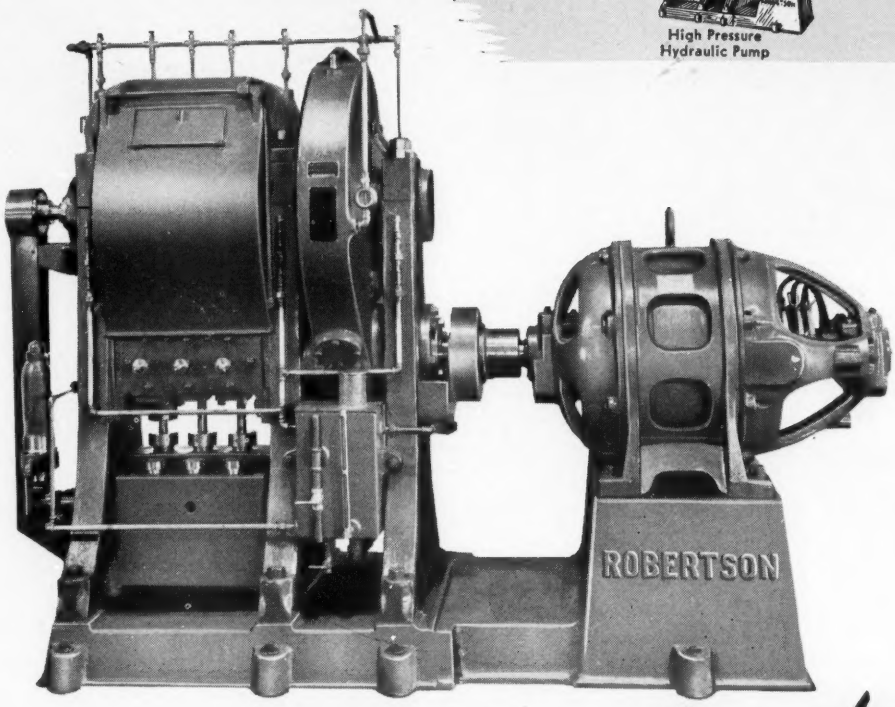
Send your wire questions to

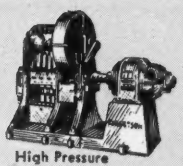
WICKWIRE SPENCER STEEL COMPANY

500 FIFTH AVENUE, NEW YORK (18), N. Y.

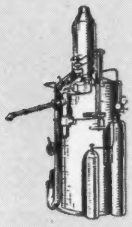
Abilene, Buffalo, Chattanooga, Chicago, Detroit, Houston, Los Angeles, Philadelphia, San Francisco, Tulsa, Worcester

WS
STANDS FOR FRIENDLINESS

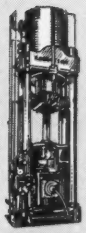




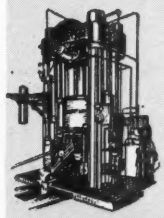
High Pressure Hydraulic Pump



Closed Lead Melting Pot



Cable Lead Encasing Press



Hose Lead Encasing Press

Hydro-Pneumatic Accumulator

Robertson's latest

HYDRAULIC PUMP

The new number 50 with eccentrics closed in and with the lubrication pump drive accomplished through bevel gears and shafting instead of through a chain. This arrangement makes it possible to have the circulating pump for the oil at the oil tank level so there is never any need for priming the lubrication pump. These new features will also be used in the numbers 60, 70, 80, and 90 pumps.

Robertson High Pressure Hydraulic Pumps are designed and constructed with the skill and "know-how" of more than three quarters of a century of building hydraulic machinery. For this reason maintenance costs are so low and operation efficiency so high that Robertson Pumps and Lead Encasing Equipment are famous throughout the world.

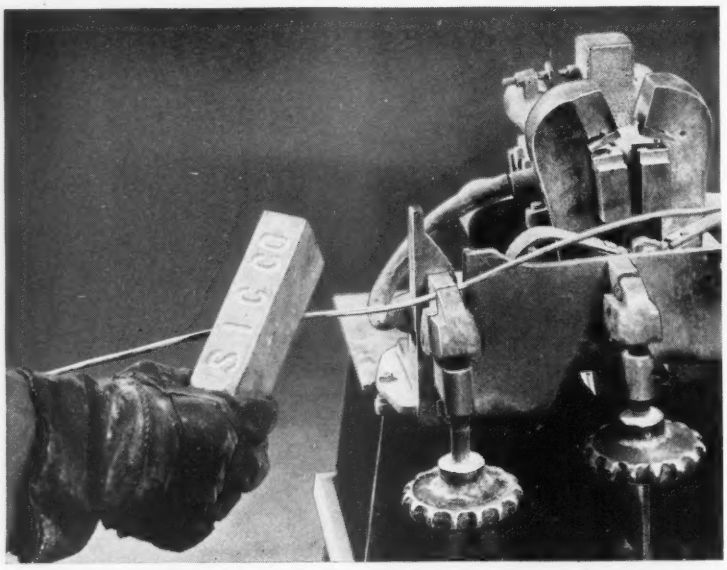
JOHN **Robertson**
COMPANY INCORPORATED

125-135 WATER STREET, BROOKLYN 1, NEW YORK

Designers and Builders of all Types of Lead Encasing Machinery

Since 1858

Standardize with Standard



Standardize with Standard

Welding of Spliced Wire With Cake of SIC CO WELDCOTE

WELDCOTE

USES: . . . . . For application to all welds on stock, either rod or wire.

FINISH: . . . . . All finishes.

CHARACTERISTICS: Has melting point adjusted so that bar should be rubbed all along weld while hot. This keeps scale from forming, which ordinarily occurs on the hot metal surface surrounding the weld.

The WELDCOTE bar forms a lubricant coating on each side and over the weld, also coats the metal with a pigment to serve as a carrier for the regular lubricant. This combination of lubricant and pigment prevents cutting and scratching on the die which occurs on untreated welds, because the heat involved in the welding operation causes scale, and the subsequent grinding of the burr leaves raw, uncoated metal, which can neither pull in lubricant, nor present a smooth surface to the surface of the die.

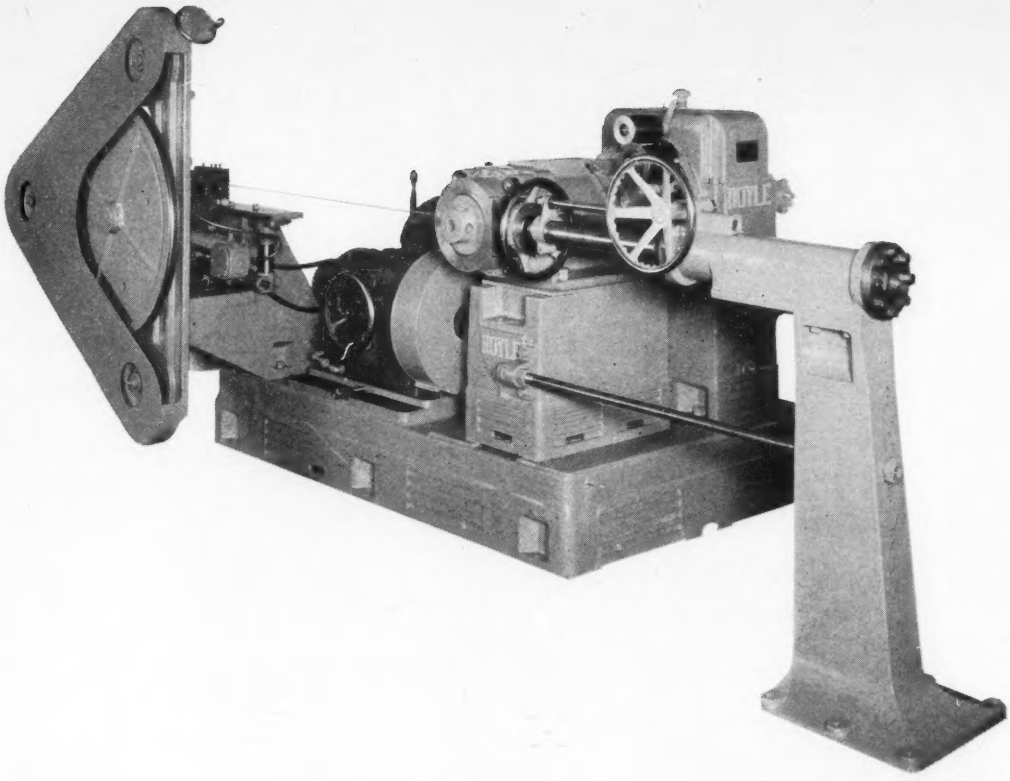
SHIPPING UNIT: . . 275-300 Pound Barrel.

Complete listing of our products contained in our catalogue, "WIRE & WIRE DRAWING—IN WORLD PROGRESS" will be sent on request. Address:

STANDARD INDUSTRIAL COMPOUNDS CO.

4600 W. FERDINAND ST.

CHICAGO 44, ILLINOIS



"WE LIKE OUR HIGH SPEED EXTRUDER..."

A lot of water has flowed over the dam since the first Royle Extruder was introduced sixty-four years ago. In 1880—and during the following decade—an impenetrable veil of secrecy existed. No extruder had ever been seen in operation nor had any report on production achievements ever been received.

That veil of secrecy is gone. In its place has come a spirit of wholesome cooperation. This cooperative spirit makes it possible to design Royle Extrusion Machines to meet the specific requirements of the application involved. As always cooperation produces maximum results.

Today, Royle production is devoted to the requirements of the Armed Forces. New applications of extrusion processes are being developed. These new processes hold promise of new and better products when Victory has been won.

JOHN ROYLE & SONS

ROYLE — PATERSON N. J. — ARMY NAVY

PIONEER BUILDERS OF EXTRUSION MACHINES SINCE 1880

PATERSON 3, NEW JERSEY

Continental Europe
JAMES DAY (MACHINERY) LTD.
LONDON, ENGLAND

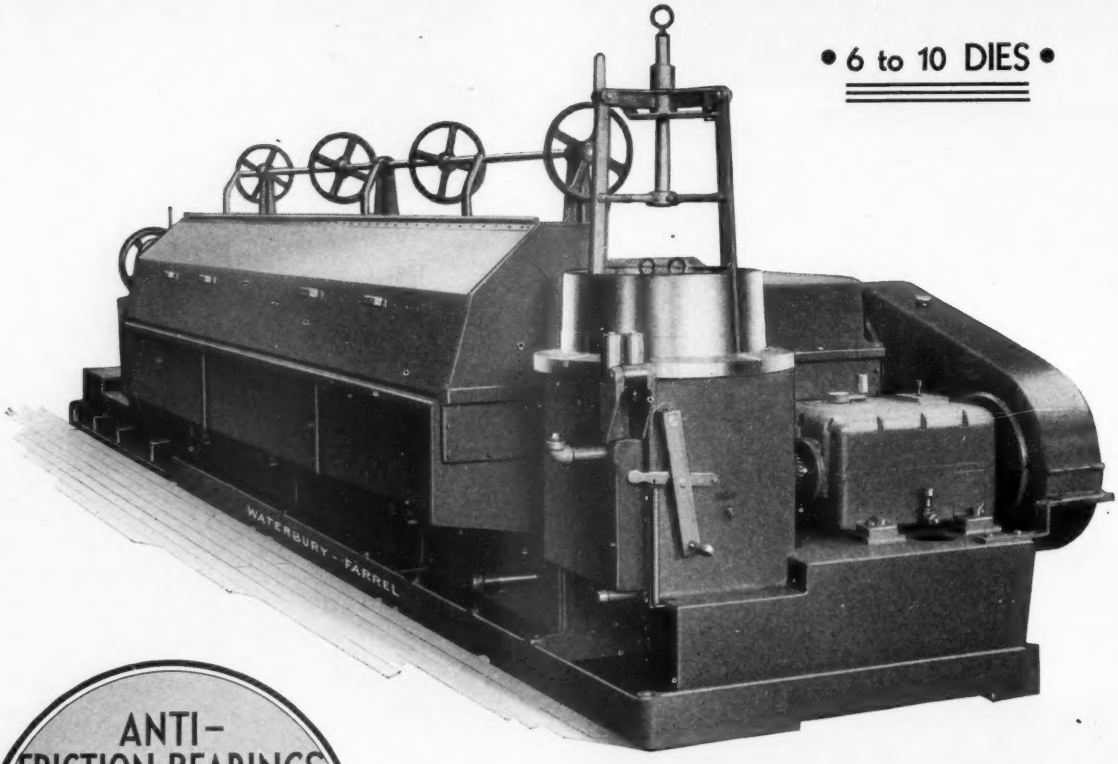
Home Office
B. H. DAVIS J. W. VAN RIPER
Sherwood 2-8262

AKRON, OHIO
J. C. CLINEFELTER
University 3726

WATERBURY-FARREL

NO. 1 TANDEM WIRE DRAWING MACHINE - FOR BRASS OR COPPER

• 6 to 10 DIES •



ANTI-FRICTION BEARINGS

FORCED FEED LUBRICATION

SPIRAL BEVEL GEARING

Change gearing provides four finishing speeds with a single speed AC main motor.

Block driven through a clutch which may be disengaged to permit rotation by hand.

THE WATERBURY FARREL FOUNDRY AND MACHINE COMPANY

WATERBURY, CONNECTICUT U.S.A.

CLEVELAND CHICAGO NEWARK, N. J.

One of a Series of Articles on Aids in Metal Fabrication

COPPER AS A DRAWING MEDIUM

THE QUICK, PRACTICAL ECONOMICAL METHOD FOR COPPER-COATING STEEL TO FACILITATE DRAWING

Copper has been used as a drawing medium, by the Wire Industry, for a considerable number of years. Originally applied by the electrolytic process—it was later applied by immersion in acid copper sulphate solution, thus obviating the use of electric current. In recent years the American Chemical Paint Company Laboratories developed a more efficient process for applying a copper coating. This method, known as the Cuprodine process, has been widely used for the past five years in wire drawing. Cuprodine produces a better copper coating than was possible by the use of copper sulphate solutions and the wire so treated withstands many more drafts. Parts which have been Cuprodized can often be recoated with Cuprodine without the removal of the previous coating, provided the initial coating has not been oxidized by open annealing.

Drawing Steel Cartridge Cases—A logical development of this new copper coating process, which has proved so satisfactory in wire mills, was its application in drawing steel cartridge cases. Here Cuprodine proved its definite superiority over other lubricating methods. It made unnecessary extensive installations of electro plating equipment, and was found to be exceptionally well adapted to a large-scale, continuous production. Test data available at the present time indicate that it has increased die life from five to ten times that obtained without its use.

The Cuprodine copper coatings are thin (varying from .00002″ to .00005″ in thickness) but very adherent. They have frequently been found to be even more adherent than electro deposited coatings. Like all copper coatings, the rust resistance is limited although their stability is ample for drawing and forming operations (in a further discussion on Cuprotek we will show how Cuprodine coatings can be given considerable corrosion protection).

Requirements for Cuprodine Process. The requirements for good results with this new process are few. The metal must be clean prior to the application of the coating—grease, rust and scale must be absent.

A typical process applied to steel cartridge case cups prior to drawing includes the following steps:

1—Alkali clean.

2—Anneal for thirty minutes at 1300°F.

3—Pickle and rinse thoroughly in running water.

4—Immerse for three minutes in a solution containing 4 oz. of Cuprodine per gallon of 3% by volume 66° sulfuric acid at a temperature of 100°F.

5—Rinse in cold running water.

6—Rinse in hot water containing 10 lbs. per 100 gallons of neutral soap.

7—Dry by means of heat.

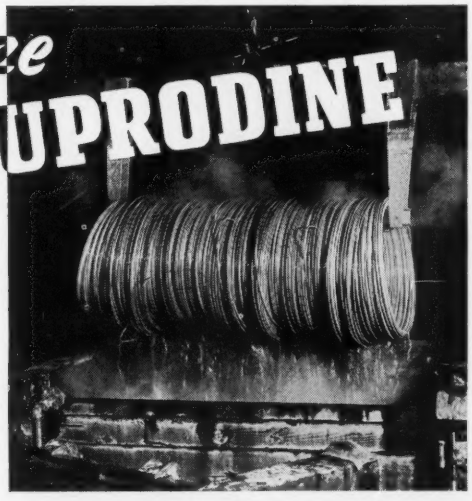
This typical procedure can be subjected to many variations. The temperature of the Cuprodine solution can vary from room temperature to 150°F., and the time would be determined in actual operation from the results obtained in drawing.

The Cuprodine bath should be maintained at optimum concentration by additions of acid and Cuprodine. Easily performed titrations determine the constituents of the Cuprodine solution and indicate the additions necessary. This can be done by the workmen on the job.

Tanks should be constructed of sheet lead, or of lead lined steel; however, wood can be used. All of the operations carried out in connection with the coating process are improved by proper agitation. Apparatus of the continuous type is very satisfactory.

The Cuprodine method of copper coating steel and iron has been generally adopted in wire mills and in small arms steel cartridge case plants. There is a large field outside these industries in various types of drawing and forming operations where the efficiency of and economy of this new method should and will be applied. The marked increase in die life, reduction in metal pick-up, improved quality of drawn parts, freedom from scratches and minimized breakage all suggest a careful investigation of the Cuprodine process by all fabricators of drawn parts.

Cuprodize *with* CUPRODINE



for:

- MORE DRAFTS
  Increased Production
- LONGER DIE LIFE
- LESS METAL PICKUP
- LESS SCRATCHING AND BREAKAGE

Cuprodine is more than a lubricant—it is a chemical which reacts with the steel dissolving such minute quantities as are necessary to form a thin, adherent copper coating.

Cuprodizing wire to facilitate drawing is widely practiced in the mills. Cuprodizing strips, blanks, cups and shell cases of steel has improved drawing and speeded production.

With proper processing Cuprodized surfaces may be used for decorative purposes.

Cuprodized surfaces may be made more rust resistant if treated with Cuprotek.

Manufacturers of Inhibitors & Metal Working Chemicals

AMERICAN CHEMICAL PAINT CO.
AMBLER ACP PENNA.

Note—West Coast Plants may address inquiries and orders for prompt delivery to Leon Finch, Ltd., 728 East 59th St., Los Angeles, California.

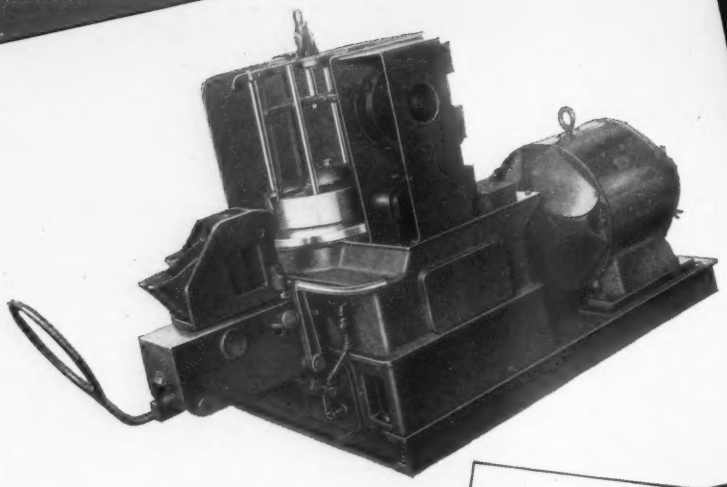
AMERICAN CHEMICAL PAINT COMPANY, AMBLER, PA.

Please send me general Technical Service Data Sheets on

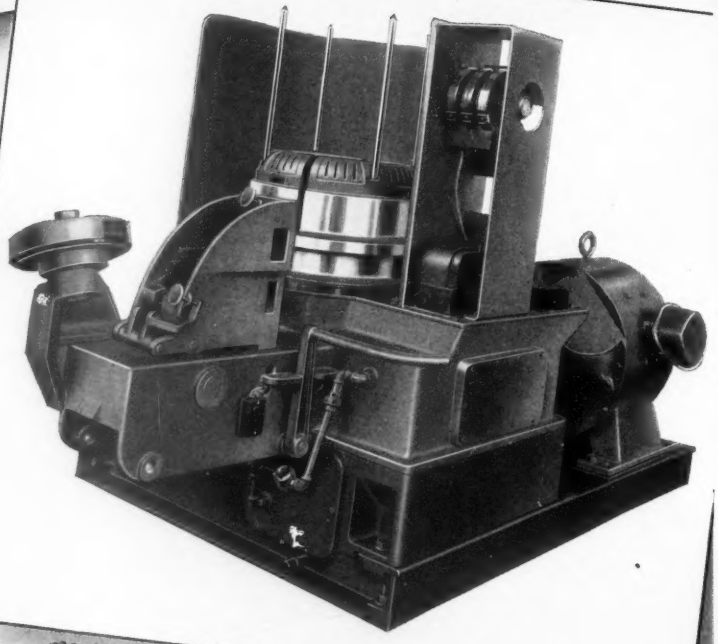
Name_____ Title_____ ☐ *Cuprodine*

Company_____ ☐ *Cuprotek*

Address_____ D-2



MORGAN
WORCESTER
ENGINEERS AND
MANUFACTURERS



MORGAN WIRE BLOCKS

Morgan Vertical Spindle Wire Blocks offer many important features, new to this type of wire drawing equipment . . . Single and double deck blocks . . . Interchangeable blocks . . . Air-cooled blocks embodying new patented fin type construction, resulting in great dissipation of heat. Die boxes fully adjustable for horizontal and vertical cast, and equipped to receive all common sizes of die holders. Each machine is unit powered, driven by combination spiral bevel and helical gears that give high efficiency at all ratios. Machines are equipped with modern safety devices.

COMBINING ALL IMPORTANT PRODUCTION FACTORS

Morgan Wire Drawing Machinery meets the need for increased production capacity combined with safety, conservation of power, greater production per square foot of plant space and lower maintenance costs. Put Morgan Equipment high in your list of things to plan on to speed output in the great production drive after the war.

MORGAN CONSTRUCTION COMPANY
WORCESTER, MASSACHUSETTS

W-84

WIRE AND WIRE PRODUCTS

A monthly publication devoted to the production of Wire, Rod and Strip, Wire and Rod Products and Insulated Wire and Cable

DRAWING — ROLLING — EXTRUDING — FORMING — FABRICATING

Vol. 19 FEBRUARY, 1944 No. 2

Designated as

Official Publication By The Wire Association

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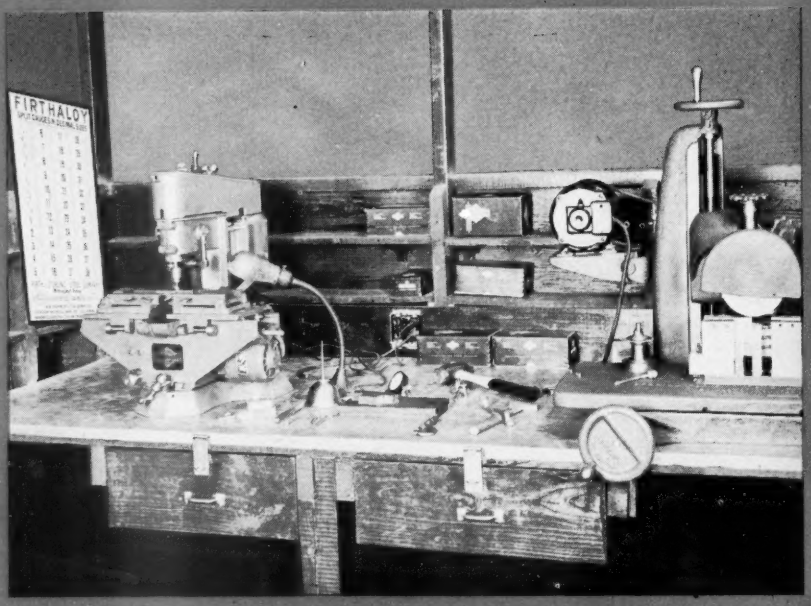
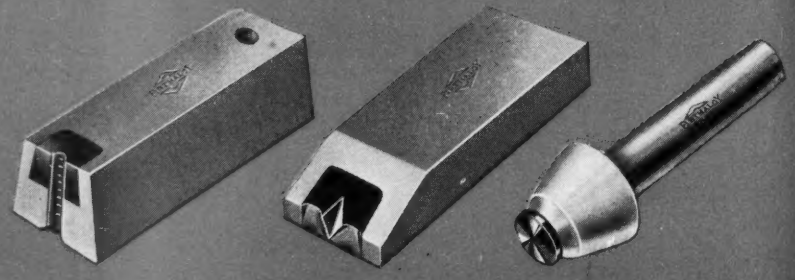


ABOVE: A typical nail-die room, showing the very simple installation required for servicing FIRTHALOY Sintered Carbide.

GRIPPER **KNIFE** **HAMMER**



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WIRE AND WIRE PRODUCTS

A monthly publication devoted to the production of Wire, Rod and Strip.
Wire Products and Insulated Wire and Cable.
DRAWING --- ROLLING --- EXTRUDING --- FORMING --- FABRICATING

Vol. 19 FEBRUARY, 1944 No. 2

Wire Tests and Specifications

By Geoffrey K. Rylands,
General Manager, Rylands Brothers Limited,
Warrington, England.

UNDER modern conditions, wire is used for a vast variety of purposes. In the very old days, when it was drawn principally from Puddled Iron in very short lengths, its use was restricted to a few specialised outlets, and while the problems of the Manufacturer in producing the wire were great, the tests which he had to perform on the finished product were simple.

✦ ✦ ✦

TO-DAY, with the tremendous improvements in steel manufacture and rod production which have taken place, the uses to which Drawn Wire can be put are almost infinite. Perhaps someone will write a book entitled "Wire in Peace and War." It is not likely such a work would run to more than one edition, but the select few who read it would discover what inestimable benefits the Wire Manufacturer has conferred on humanity.

✦ ✦ ✦

IF we consider Wire and the Individual, we may reflect that the safety pin which secures all the essential portions of a baby's

"Alice thought the whole thing very absurd, but they all looked so grave that she did not dare to laugh—"
Lewis Carroll

raiment is made of wire. The springs of the armchair in which one takes one's ease and of the mattress on which one enjoys one's rest, are made of wire. The boots and shoes which one wears contain wire in several different forms. The buckles of Braces in the Old World, and Suspenders in the New World, are made of wire, and finally wire appears again in the nails of one's coffin. So whoever you are, or whatever you do, wire is your constant companion from the cradle to the grave.

✦ ✦ ✦

FOR war purposes we may also reflect that there is not a single weapon of war into which wire in some form or other does not enter. It is unnecessary to particularise, for any Wire Manufacturer can, with a moment's thought, name any number of purposes and parts in guns, tanks, aeroplanes, bombs, shells and torpedoes, for which wire is used, from Heading Wire to the humblest Split Pin.

✦ ✦ ✦

THE Wire Manufacturer is constantly confronted with the problem of supplying the right kind of wire for the job which it is called upon to perform. In peace time the problem can be tackled directly between the consumer and the manufacturer. The consumer merely asks the manufacturer for the quality of wire which will suit his purpose, and after some trial and experiment the manufacturer determines the type of steel and the process of production which will yield a satisfactory product. In war time, however, the procedure is not so simple. Government Departments require their supplies against a definite and rigid specification, and in most cases the requirements of the specification are quite irrelevant to the purpose for which the wire is required.

✦ ✦ ✦

THIS leads us, therefore, to the question of wire testing, and we have to admit right away that

Designated as Official Publication by the Wire Association

there are few tests which are normally applied which directly reflect a desired physical property in the wire. In point of fact, the test of Tensile Strength is the only one. We can measure with a high degree of accuracy the load which will cause a wire to break, and we can say very definitely that if a load is imposed on the wire in excess of its maximum load, it will inevitably break. This very obvious fact frequently escapes the notice of many users of wire. Practically all the other tests usually employed, such as the Torsion Test, Reverse Bend Test, Wrapping Test, measurement of Elongation at Fracture, are all indirect tests and are supposed to reflect some useful property which the wire should possess for the purpose for which it is to be used.

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IT is well worth while considering what these various tests do mean, and we will start off with the Elongation at Fracture. In Hard Drawn Wire, except by the use of delicate apparatus, this quantity is extremely difficult to measure accurately, and when it has been measured it can mean very little. There is some vague idea that elongation is a measure of ductility, but a moment's consideration will show that this assumption is entirely false. In any number of cases one can find a Hard Drawn Wire which is thoroughly brittle and unsatisfactory, which still yields quite a normal elongation. If the elongation is a measure of anything it is a measure of elasticity-cum-plasticity. The elastic extension of a wire depends on its modulus, which is known fairly accurately. The elastic extension at the stress corresponding to fracture can therefore be calculated, and any extension in excess of this figure represents a plastic extension.

✦ ✦ ✦

IN Fig. 1 the Load Extension Diagram of a Bright Drawn Wire is compared with that of the same wire Hot Galvanized. It will be observed that up to approximately 90% of the Maximum Load the extension on both wires is almost identical, and that the increased elongation on the Galvanized Wire takes place between about 90% of the maximum load and the point of fracture.

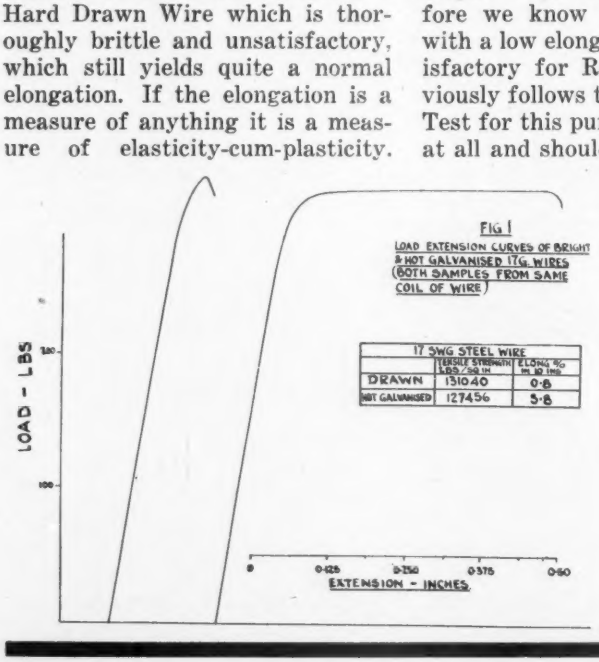
✦ ✦ ✦

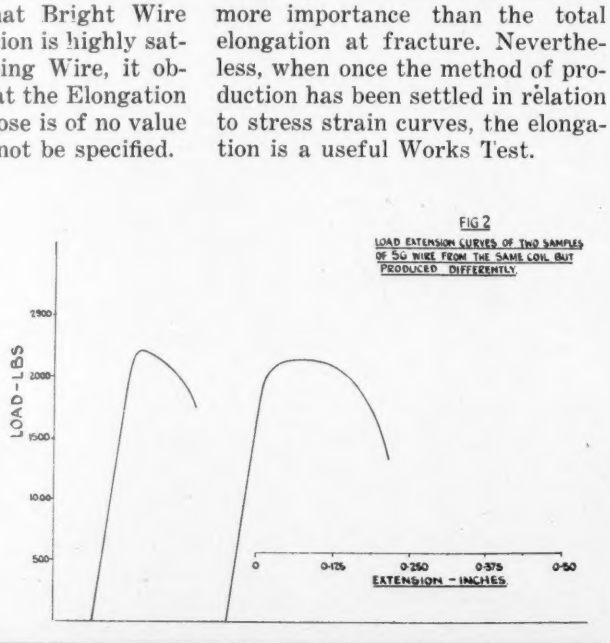
UNDER normal circumstances how a wire may behave when it is stressed beyond 90% of its ultimate stress can be of very little importance. Nevertheless, in many specifications for Roping Wire for example, the elongation of a Hot Galvanized Wire is set at a higher figure than for Bright Wire, which is of course inconsistent. If in fact the higher value of elongation is necessary at all, it must be equally necessary whether the wire is bright or galvanized. Since therefore we know that Bright Wire with a low elongation is highly satisfactory for Roping Wire, it obviously follows that the Elongation Test for this purpose is of no value at all and should not be specified.

IN Fig. 2 Load Extension Diagrams of two lightly drawn Mild Steel Wires of the same quality but produced by rather different methods are compared. The tensile strengths are very much the same, but the elongations are widely different. Here again the increase in elongation of the second wire occurs after loading to a stress approaching the maximum stress, and this latter wire has a high degree of plasticity. For ordinary purposes however this means nothing, and the first wire would obviously be entirely satisfactory for Fencing, Reinforcing, Nail Wire and general purposes. The properties in the second wire would however be very desirable if it was to be used for some severe form of Cold Heading or other manipulative process. In this instance the Elongation Test is of value, and a manufacturer who is required to supply Bright Wire for some special purpose of this character would adjust his process to give these properties, and test the suitability of the wire by the value of its elongation at fracture.

✦ ✦ ✦

IN point of fact, if a wire is to be cold worked at stresses within the plastic range, the precise nature of the plastic changes as determined by stress strain curves is of more importance than the total elongation at fracture. Nevertheless, when once the method of production has been settled in relation to stress strain curves, the elongation is a useful Works Test.





IT has already been stated that the Elongation at Fracture is a measure of the elasticity-cum-plasticity of the wire, but it is often forgotten that plasticity at low stresses is the most valuable property of wire. Obviously a perfectly elastic wire, that is to say, a wire in which the strain is proportional to the stress up to the ultimate stress, can only be bent round a radius so great that the skin stress imposed in bending does not exceed the elastic limit which we have postulated is equal to the ultimate stress.

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SUCH wire would indeed be deemed extremely brittle and would fracture at once if any attempt were made to wrap round its own diameter, or to snarl it. Nevertheless, some years ago the theory was propounded that wire with a very high elastic limit was eminently desirable for Roping Wire. We were indeed so interested in this theory that we made up a rope of Oil Hardened and Tempered Wires in which the elastic limit was approximately 80% of the ultimate stress. We were surprised to find that after a few revolutions on the Endurance Testing Machine, the rope had the appearance of a particularly vicious porcupine. After some further experience and careful consideration of this result the reason became clear, and this line of experiment was abandoned. Apparently the same idea gained credence in America, if it did not originate there, for the wires for the Mount Hope Suspension Bridge were finally heat treated, presumably with the idea of giving them a very high elastic limit.

✦ ✦ ✦

THE remarkable point is that these wires were produced to a very rigid specification comprising tensile strength, elongation and reduction of area at fracture. In addition, they were subjected to a Wrapping Test around a four diameter mandrel. It was no doubt assumed that these tests were quite adequate to prove the suitability of the wire for the purpose. Nevertheless they failed, and were replaced by Cold Drawn Wires which possessed identical properties and yet up to the present no fractures have taken place.

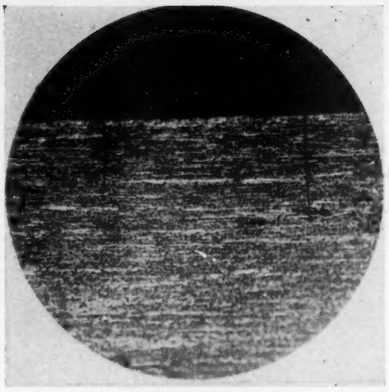

Fig. 3. X100. Hairline cracks developed at the crown of the bend in a finally heat treated wire.

✦ ✦ ✦

IN the heat treated wires the fractures were discovered where the wires were anchored round the terminal shoes, and the cause of the failure now seems fairly clear. The fact of bending these almost perfectly elastic wires round the terminal shoes imposed a high skin stress, and when subsequently a tensile loading was also imposed, the skin stress exceeded the ultimate stress and cracks similar to those shown in Fig. 3 immediately developed, which propagated rapidly towards the centre of the wire, finally resulting in fracture.

✦ ✦ ✦

DURING the investigation of these failures, among other properties examined were stress/strain relations, and although it had been noted that the cold worked wires were capable of creeping, the point which seems to have escaped observation is the fact that when severely bent a cold worked wire is incapable of maintaining a high skin stress, and immediately yields with a production of considerable plastic extension at quite low loads.

✦ ✦ ✦

IN addition, the hysteresis property of cold worked wire is vastly different from that of heat treated wire, and an examination of cyclic curves shows that cold worked wire is capable of releasing dangerous over-stresses when repeatedly applied, whereas a heat treated wire is shown to have permanent characteristics.

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A LACK of appreciation of these important properties in wire, resulted some years ago in a specification being drawn up in which a very high elongation was required in a wire having a maximum stress of 40/50 tons per square inch. The only method by which results could be secured was to use an Annealed Medium Carbon Steel. The wire produced to the specification was galvanized and made up into a 7 wire strand which had to be bent round a small thimble. The wires failed very early in service, and in almost every case developed fractures at the crown of the thimble. A number of strands which had been in service for a short time and which had not actually failed were examined, and in numerous cases it was found that fine hair-cracks had already developed at the crown of the thimble, and it could only have been a matter of a very short time before these wires had finally fractured. A photomicrograph of one of these wires is shown in Fig. 3. This failure is therefore exactly analogous to that of the wires in the Mount Hope Suspension Bridge, namely, the initial skin stress imposed on bending plus the stress imposed by tensile loading exceeded the ultimate strength of the wire, so that skin cracks developed which rapidly became deep fissures.

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WE may therefore conclude that so far as wire is concerned, the Elongation Test is of little or no value except perhaps in the case of wire which is to be subjected to some severe manipulative process within the plastic range.

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REFERENCE has already been made to the plastic properties of wire at low stresses, and it seems odd that there is still a pathetic faith in the universal validity of Hooke's Law. Probably

the reason is that the usual autographic stress strain diagram is produced on a very small scale which entirely masks the form of the curve. In addition, it is only in recent years that sensitive Extensometers suitable for wire testing have been developed.

✦ ✦ ✦

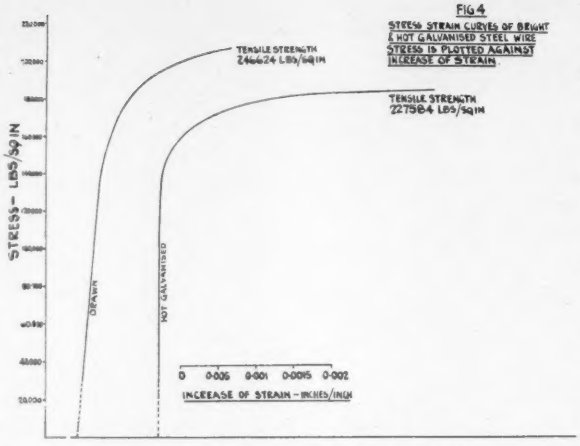
THE curves illustrated in Fig. 4 have been produced with such an extensometer, and it will be seen that in the case of Hard Drawn Wire there is no elastic limit at all, and that in no part of the curve is the stress proportional to the strain. In the case of Hot Galvanized Wire, the low temperature heat treatment of galvanizing has restored the elastic properties up to about 70% of the ultimate stress. This indeed is one of the most unfortunate effects of Hot Galvanizing in carbon steel wires, and for this reason it is better to adopt the Drawn Galvanized Finish or alternatively use the Electro-galvanizing Process.

✦ ✦ ✦

PERHAPS the Torsion Test is still regarded as one of the most important tests controlling the quality of all kinds of wire. Thousands of tons of wire must be destroyed annually in performing this test, and it is therefore as well to consider just what we are getting out of this vast expenditure of material and effort. It is a test of some antiquity, and was no doubt usefully employed when wire was drawn from Puddled Iron. In those days it seems likely that the number of twists the wire itself would stand was not regarded as very important, but great attention was paid to the nature of the fracture. With the advent of Steel and subsequently the patenting process, far more weight was gradually attached to the number of twists than to the nature of the fracture. In fact, today in many quarters it seems to be taken as axiomatic that the quality of the wire is directly proportional to the number of twists it will stand.

FIG 4

STRESS STRAIN CURVES OF BRIGHT & HOT GALVANISED STEEL WIRE STRESS IS PLOTTED AGAINST INCREASE OF STRAIN



ACTUALLY under normal conditions of usage, no wire is ever subjected to torsional stresses beyond its elastic limit, and in the majority of cases the only information one gets from the performance of the Torsion Test is that the wire will stand a given number of twists. In Soft Annealed Mild Steel either bright or galvanized, the number may be subject to considerable variation, and such variations have no relation to the actual quality of the wire. Certain Cable Companies specify high values of twists on Galvanized Mild Steel Cable Wire, frequently as high as 60 in 100 diameters in sizes as thick as 1 gauge, presumably in the fond belief that they are getting something really good. Since piped wire and wire which is very brittle will frequently stand twists in accordance with the specification, the usefulness of the test is indeed open to question.

✦ ✦ ✦

HARD Drawn Mild Steel Wires either bright or galvanized frequently stand a very small number of twists, and this is assumed to indicate that the wire lacks uniformity and is brittle at the point of fracture. If, however, a test piece is examined, it will be found that fracture takes place only because the twists have not run along the length of the wire but have bunched up at one point, and the wire at this point has indeed stood a very large number of twists. If, therefore, the number of torsions over a length is a measure of the brittleness, the wire is certainly not brittle at the point of fracture. All that the test has indicated is that the cold work of twisting at the point where the twist started has not hardened up the wire sufficiently to transmit the twist along the specimen. On the same test piece other means can be used for determining whether the wire is brittle, such as for example, the Snarl Test or the Wrapping Test, both of which tests will reveal that the wire is perfectly sound.

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FOR Mild Steel Wire, therefore, we can conclude that the Torsion Test is of little or no value.

✦ ✦ ✦

IN the case of Carbon Steel Wires, the conditions are somewhat different, but here again too much weight is attached to the number of twists. The absurdity is well illustrated by the terms of many specifications which impose a graduated scale of twists, depending on the tensile strength of the wire, so that for example a wire breaking at 107 tons per square inch standing a given number of twists might be rejected for an order where the specified tensile strength was 100/110 tons per square inch, but would be accepted within the range of 105/115 tons per square inch. This is clearly a case where the specification is framed on the number of twists the wire may be expected to stand rather than the number it is necessary for it to stand.

✦ ✦ ✦

AGAIN, in most specifications, a far lower number of twists is permitted in the case of Galvanized Wire than in Bright Wire. This in itself is evidence that the number of twists is of little importance in relation to the service which the wire has to perform.

✦ ✦ ✦

IN Carbon Steel the real importance of the Torsion Test is the fact that it does reveal the presence of longitudinal surface defects, the presence of these being

revealed by the specimen breaking away and flying at the instant of fracture. When this occurs, if the specimen is examined it will be found that the actual fracture shows a clean shear, but immediately fracture has taken place the wire has sprung back with such violence as to cause a secondary fracture of helical form (Fig. 5). A test piece of this character will almost always show a fine longitudinal split.

✦ ✦ ✦

A ROUGH lumpy test specimen, even if it does not fly at the instant of fracture, is a fair indication of surface troubles, and if such specimen is held close to the ear and bent, it will crackle. The presence of surface defects can be confirmed by cross-sectional microexamination; (Fig. 6) illustrates two of these defects on a wire which had given a satisfactory number of twists, but in the specimen was rough and lumpy. The cross-sectional examination was of course made on a portion of the specimen which had not been twisted.

✦ ✦ ✦

IT seems evident, therefore, that the principal usefulness of the Torsion Test in Carbon Steel Wire is the indication that it may give of the existence of surface defects, and for this purpose it would be very much better if a Reverse Torsion Test was applied consisting of say 5 turns in one direction and 5 turns in the opposite direction. Under this test any surface defects present would immediately become apparent.

✦ ✦ ✦

IT has frequently been argued that no wire containing surface defects could ever stand a satisfactory number of twists according to current specifications. This however is quite untrue, and in fact the wire illustrated in Fig. 6 above is a case in point.

✦ ✦ ✦

IT is also untrue that brittle wire necessarily fails under the Torsion Test. Any number of cases occur where wire standing a high number of twists will break at the first pull up in snarling, generally with a long tongue-shaped fracture. It is true, however, that the number of twists a wire will stand is very sensitive to strain age-hardening and hydrogen brittleness, and very low torsions, for example, below 10 in 100 diameters, is evidence that these defects are present. The Reverse Bend Test to which we next refer is however equally effective in revealing their presence.

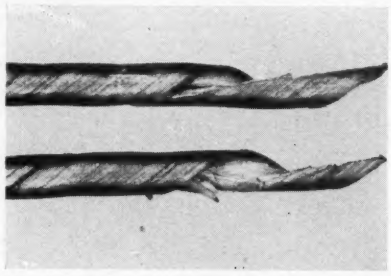


Fig. 5. X2½. Secondary fracture of helical form on a twisted specimen. ✦ ✦ ✦

THE Reverse Bend Test is of considerable value, and the importance attached to it has grown over recent years. It is a test which reflects to some extent the treatment to which a wire will be subjected in service. Its value for Mild Steel Wire is small, and it is far more applicable to Carbon Steel

Fig. 6. X100. Surface defects on a wire which gave rise to secondary fracture under twist illustrated in Fig. 5. ✦ ✦ ✦

Wires. One of its disadvantages is that the number of bends a wire will stand will depend on the type of Testing Machine used. The bends will also vary with the rate at which the test is performed, and it is necessary, therefore, both to specify the type of machine and a rate of testing. It is to be hoped, however, that in the course of time some standard form of Bend Testing Machine may be universally adopted.

THIS test in Carbon Steel Wires will eliminate badly patented and overdrawn wires. Any wire which when fractured under this test shows a long tongue-shaped fracture should be regarded with suspicion.

✦ ✦ ✦

THE Wrapping Test is one of general usefulness both for Mild Steel and Carbon Steel Wire. Any wire should stand wrapping onto and unwrapping off its own diameter. The number of turns applied is not very material, but 8 turns on and 7 turns off is a very convenient number. This is a simple test requiring no elaborate apparatus, and is easily performed. It is positive and decisive. The wire either passes it or fails, and the difficulty of fixing a minimum number as in the Torsion Test or Bend Test, below which the wire is deemed to be faulty does not exist. For wire supplied for general purposes and for many special purposes too, this test provides an excellent control of quality.

✦ ✦ ✦

FINALLY we come to the almost universal Works Test of Snarling. Performed by an experienced man this is probably the best test of all. Unfortunately it cannot be stated in simple terms with sufficient precision of definition. Every man will snarl a wire somewhat differently, and indeed the snarler can very easily control the number of snarls a wire will withstand. Obviously, therefore, for specification purposes this test cannot be used, but it is nevertheless an excellent Works Test.

✦ ✦ ✦

SPECIFICATIONS for wire are many and various, and since the war confusion has become very great. Some attempts have been made at simplification, but in the main these have led to a still greater complexity, and an increase in the number of specifications which are applied.

✦ ✦ ✦

IN general a specification is supposed to control the quality of material supplied for a given pur-

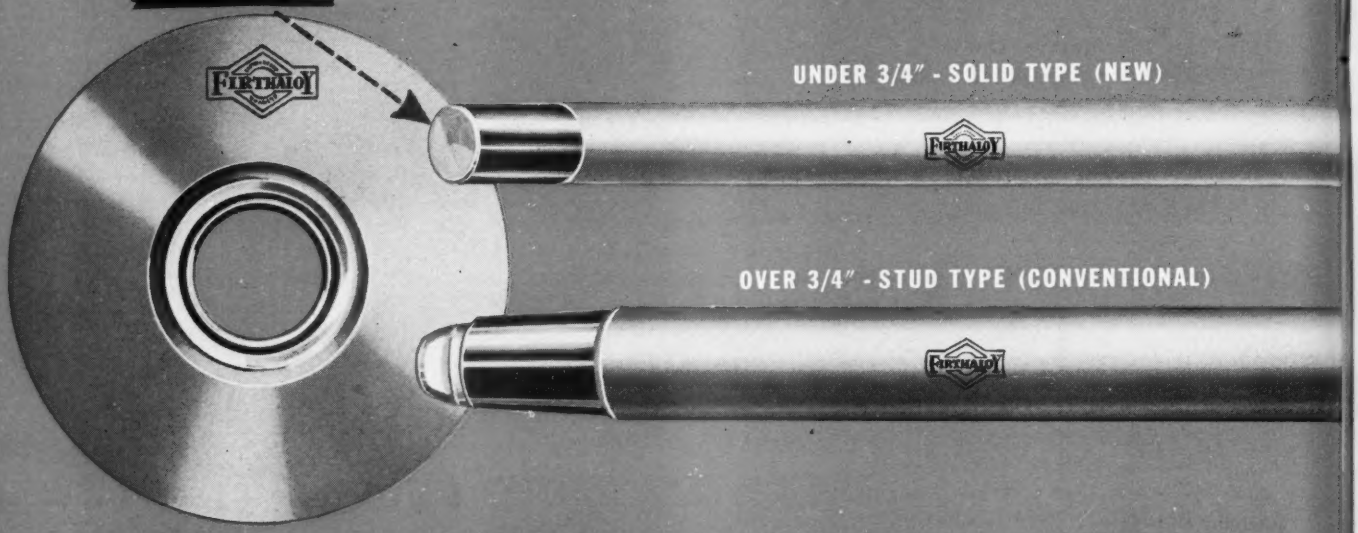
(Please turn to Page 126)

Another Tube-Drawing Improvement!

by Firthaloy

(the Standard Carbide)

Solid Mandrels for Small I. D.



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Some Practical Facts About the By-Products Formed in Different Fields of Hot-Dip Galvanizing

By Wallace G. Imhoff,
President, The Wallace G. Imhoff Co., Vineland, New Jersey.

PART III

(Published in Three Parts)

Part I relating to Dross Production in the various fields of Hot Dip Galvanizing was published in the November 1943 issue. ✦ ✦ ✦

Part II relating to Oxide Skimmings was published in the December 1943 issue. ✦ ✦ ✦ ✦ ✦

Total By-Products

General Statement:

WHEN all of the by-products are plotted on a graph we find that the places of the different fields have again shifted. The table below shows the different percentage total by-products made in each field of galvanizing.

✦ ✦ ✦

ALL of these figures in these various tables are not only extremely interesting, but very practical. Having all of the fields before the picture enlarges the viewpoint and may furnish some new ideas, or suggestions that may be of value in understanding the by-product control of other fields. It is of much importance to just discuss briefly the above figures in Table 4 and also while doing so the graph can be studied. Malleable Iron Castings is in first place because of the very high dross production in that field of galvanizing. The soft base metal was cited as one of the reasons for the high dross production.

✦ ✦ ✦

IF we look at the dross graph, Figure 1, we see that the Pole-Line Hardware field of galvanizing is the second highest dross producing field and that is the reason it is found in second place on the total by-products graph. The same reason holds for the field of Job and Miscellaneous galvanizing. All three hold exactly the same places on the total graph that they do on the dross graph. On the total graph we find that the field of Range Boilers and Tanks has jumped up into fourth place because it has the highest production of oxide skimmings. The fields of Wire and Pipe are both next because of their high dross, and we find them in about the same places, 5 and 6 on the total graph that they are on the dross graph. Structural Steel galvanizing is pulled up into 7th place on the total graph because of its high dross production, it being in 4th place on the dross graph. Both the sal-ammoniac skimmings and dross put the field of Wire Cloth galvanizing into 8th place on the total graph. The same causes push the field of Metal Ware galvanizing ahead of Sheet Galvanizing in the total graph. And finally we have the field of sheet galvanizing as producing the lowest total amount of all by-products.

TABLE 4

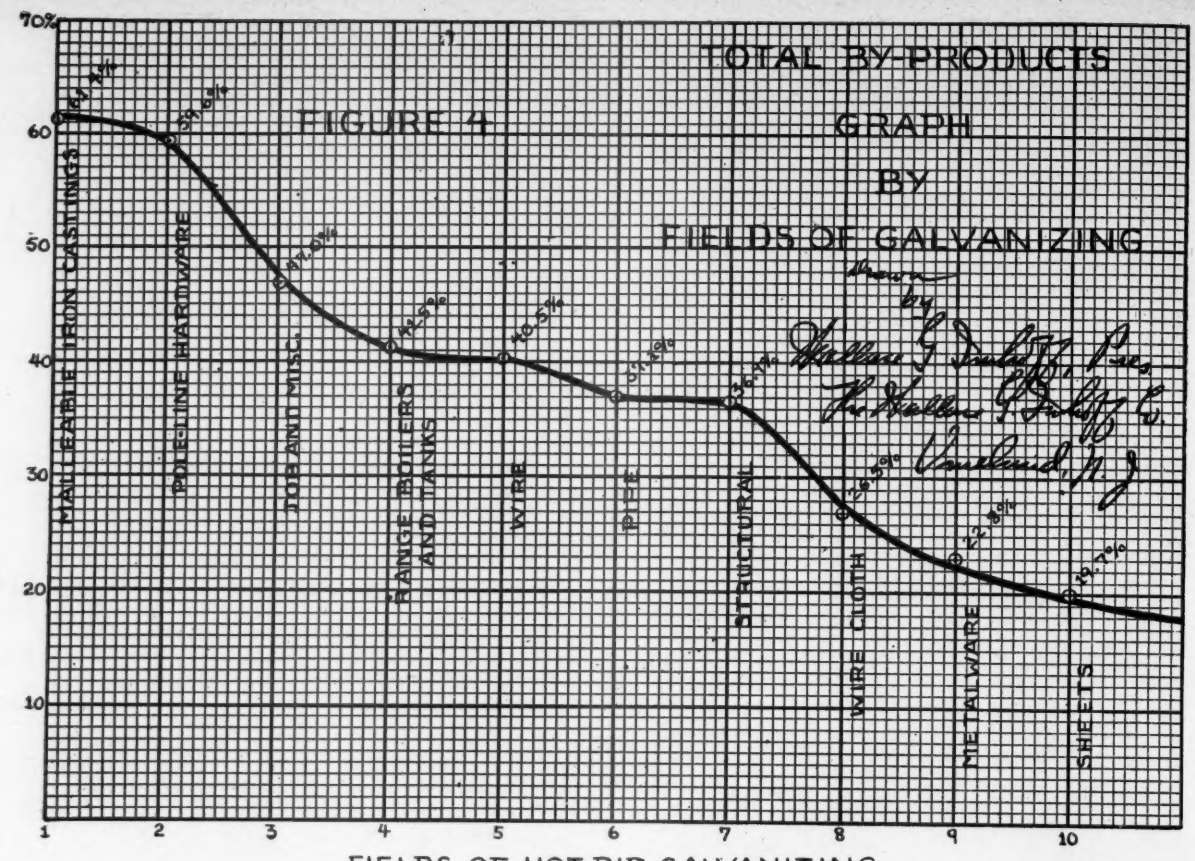
Total Average Percentage of By-Products Made in All of the Different Fields of Hot-Dip Galvanizing	
1. Malleable Iron Castings	61.4%
2. Pole-Line Hardware	59.6%
3. Job and Miscellaneous	47.0%
4. Range Boilers and Tanks	41.5%
5. Wire	40.5%
6. Pipe	37.1%
7. Structural	36.9%
8. Wirecloth	26.5%
9. Metal Ware	22.8%
10. Sheets	19.7%

Assembled Graphs

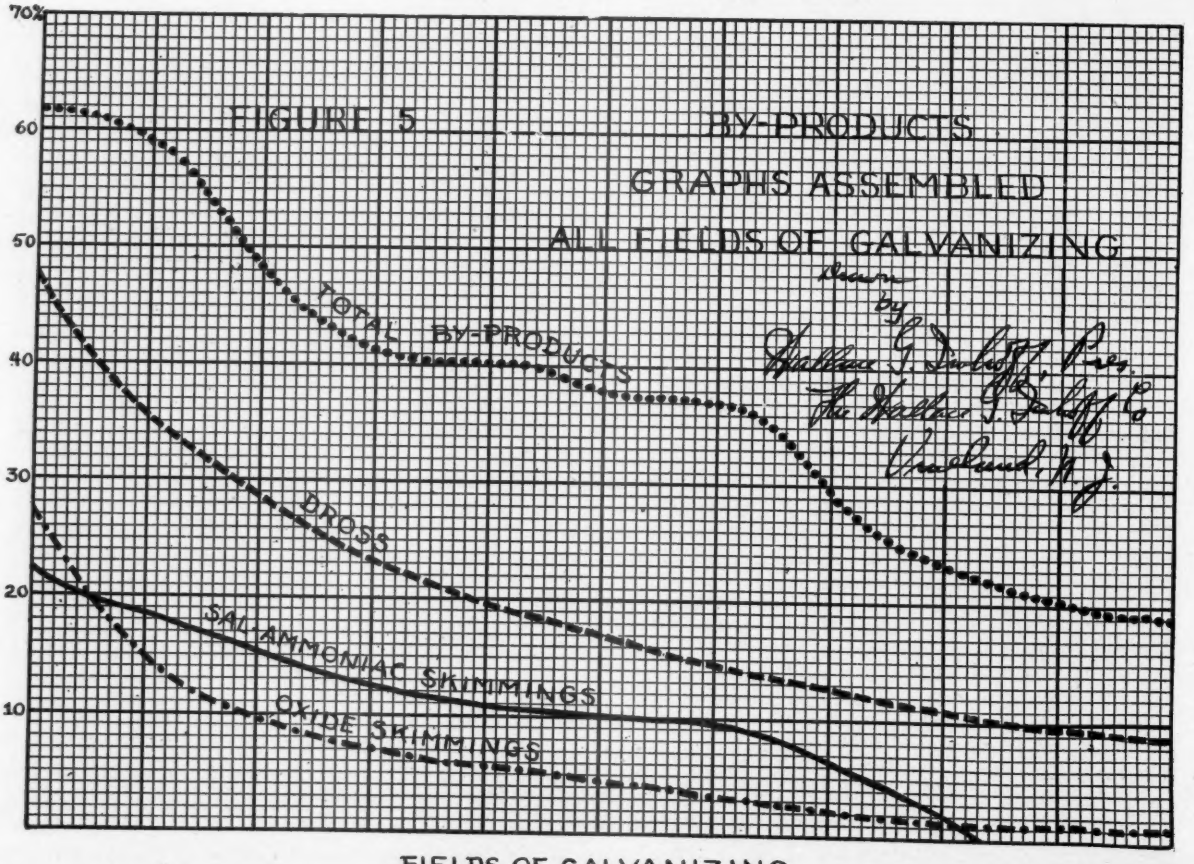
MERELY to have the whole situation at a glance all of the graphs have been assembled in one figure which is shown in Figure 5. The one important fact brought out by doing this is to clearly reveal that only in one place does the oxide skimming graph cut through the sal-ammoniac skimming graph, and that is at the left hand side of the graph. Here we see that this is due to the very high quantity of oxide skimmings produced in the field of Range Boiler and Tank Galvanizing. Because both the fields of Sheets and Pipe have the same amount of sal-ammoniac skimmings production, 9.0%, this graph appears to cut the oxide graph on the right. From the Assembled Graph Figure it can be seen that in the order of quantities made the by-products in all field are dross, sal-ammoniac skimmings, and oxide skimmings. The exception is found in the Range Boiler and Tank field of galvanizing which shows the order of dross, oxide skimmings, and sal-ammoniac skimmings.

✦ ✦ ✦

ANOTHER very interesting variation in the study of the by-products made in all fields of hot-dip galvanizing is to note



FIELDS OF HOT-DIP GALVANIZING



FIELDS OF GALVANIZING

how they change their position when considering the different percentages of by-products produced. The graph showing the CHANGE OF POSITION of the different fields of galvanizing is shown in Figure 6.

✦ ✦ ✦

THIS chart or graph also brings out a few very interesting facts. The curves have been plotted according to the change of position, or place taken by each field of galvanizing when the different percentages of each by-product are compared. The striking point brought out by this graph is that the Fields of Range Boilers and tanks, Pipe, and Metalware, all show a peak toward the oxide skimmings, while the fields of Malleable Iron Castings, Pole-Line Hardware, Job and Miscellaneous galvanizing, Wire, and Wire Cloth, all show the reverse peak on oxide skimmings. Another interesting fact shown is that the fields of Structural Steel Galvanizing and Sheets do not follow either group above, but have individual characteristics of their own. The groups reverse themselves on the Sal-ammoniac skimmings line. If we consider the maximum by-product production we find that the three greatest dross producing fields are Malleable iron castings, Pole-Line Hardware, and Job and Miscellaneous Galvanizing. The three greatest oxide producing fields are Range Boiler and Tanks, Pipe, and Metal Ware. The three greatest sal-ammoniac skimming producing fields of galvanizing are Pole-Line Hardware, Wire, and Wire Cloth.

✦ ✦ ✦

IN making any individual comparison of plant figures with those given here if there is a considerable difference there is no doubt some very definite reason. For example, it has been found that the job galvanizers production varies widely from place to place in kind of articles. War work has also no doubt been the cause of an extreme change of articles galvanized in many plants. A feature of note is that some plants are typical fields, such as range boilers and tanks and pole line hardware; other fields may overlap and galvanize articles from many other fields. It can readily be appreciated therefore that these figures which are average figures might show a considerable difference.

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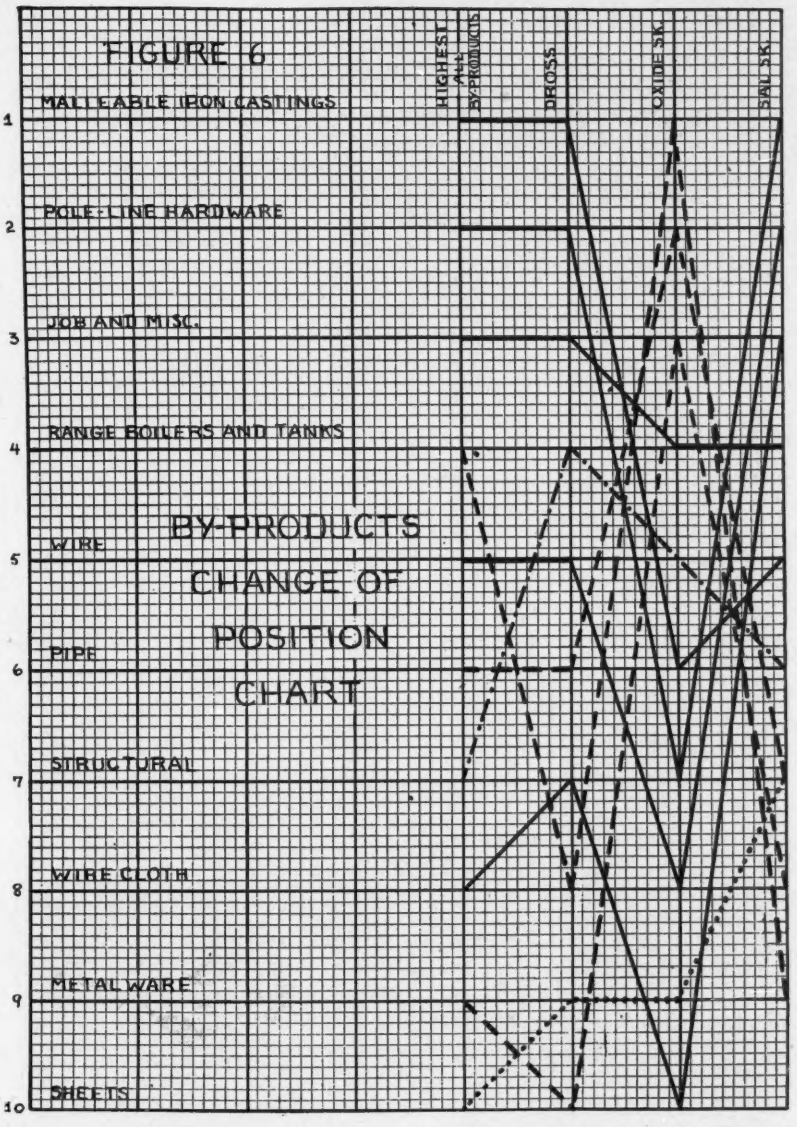


Fine Die Production in the United States

By Winfield C. Moses,
Secretary, Ajax Industrial Supplies, Inc.,
Fort Wayne 8, Indiana.

THE progress made by the diamond die industry in the unknown and microscopic field of fine dies has surprised even the most enthusiastic.

✦ ✦ ✦

TWO years ago, only rare and exceptional dies below .0015" were produced in the United States, while today production is on a regular basis in adequate numbers to supply the fine wire needed in our communication equipment. By far the largest part of the manpower in the diamond die industry in the U. S. is employed on fine dies and the bottleneck, which threatened the war effort when importation of fine dies ceased, is definitely broken.

✦ ✦ ✦

FRANCE was formerly the center of the fine die industry. With simple, yet accurate equipment, the French workman labored for weeks piercing a diamond to make one fine die. Most of this work was done at home and the art was handed from father to son. Several large organizations worked in this manner, supplying the peasants with the diamonds which were drilled without encasing them. Comparatively speaking, however, the total number of persons employed in the industry was small, so fine die making remained an occult art. Because of the cheapness of the French labor, American die makers were content to leave this phase of the work remain in Europe, where a lower standard of living made it profitable.

The diamond die industry has undergone notable changes as a result of the war. Mr. Moses' article sets forth these changes and calls attention to problems still to be solved. ✦ ✦ ✦ ✦ ✦ ✦

BUT, as the war developed, it soon became evident that the stock of dies on hand would not be adequate in a war, which is growing more mechanically complex even today. The United States faced a war based on mechanical instruments without the basic tool needed for these instruments!

✦ ✦ ✦

INTO this breach stepped the W.P.B. to encourage the die makers of the United States to meet the situation. The diamond die industry was not completely unprepared even at this time. Several companies had made experimental fine dies. Small die drillers in the midwestern die plants were being urged to see how fine they could drill an occasional die. In an unorganized manner, the die industry had experimented enough to know the problems involved and also the difficulty of making a reasonable return for the large amount of labor involved.

WINFIELD MOSES
Graduated from Indiana University Law School. Left practice of law to help organize Ajax Industrial Supplies, Inc., in 1941 and has served as Secretary and Sales Manager since.

✦ ✦ ✦

FACING these problems, the War Production Board decided, not to subsidize the industry, as had been done in England, but to stabilize prices at a level where a reasonable profit could be expected. With this incentive, the industry as a whole has made a successful effort to put fine die production on a regular and steady basis. Amazing progress has been made, but the task has not been a simple one. The problems of management in a field where a slight pressure for production could easily result in a slowing of production, is a delicate one, but certain production goals must be met, and the nerves can strain a long way before actually breaking. The operators are bearing their share of the burden as they strain themselves to work more delicately than they have ever done, and are learning more than they have ever known, the meaning of patience.

✦ ✦ ✦

THE manner of achieving fine die production has been considerably different in the shops of the east than that used in the industry in Fort Wayne, Indiana. The Fort Wayne die shops had produced small dies for years, so their approach was simply one of

Fig. 1. After carefully weighing and sorting the rough diamonds, they must be placed and secured in a mounting. In the above photo a workman is carefully placing the selected diamond in the case preparatory to pressing and sealing the diamond securely in the case.

Fig. 2. Diamond dust is used in the drilling machines to bore the holes through the diamonds in the center of the dies, so the process is really diamond cutting diamond. Here a worker grades one of the 15 different grades of dust used.

training the present operators to drill even smaller on the same type of equipment which they had been using. The shops in the east had devoted their efforts to larger dies and their machinery was completely inadequate to fine die production. So new equipment was devised, and an effort made to place the manufacture of fine dies on a more automatic basis. Some of this equipment is now in use in Fort Wayne, too, and it is to be expected that the combination of the operating skill of the midwestern shops and a more perfected type of machinery will produce a die of higher caliber than that made even now.

✦ ✦ ✦

THE perfection rather than the production of the fine die is the present aim of the industry. As in the past, each shop is working on this problem in the way best suited to its individual situation, but certain generalities on the quality of the present fine dies can be safely made.

✦ ✦ ✦

THE problem of producing a "front," called primary and secondary cones by the industry, with a smooth surface and a regular angle is pretty well under control as the result of a machine devised for this purpose and in use in the majority of die shops today. However, the production of the very fine, yet all-important "bearing" in a precise and accurate manner is yet unsolved. That this problem will be successfully solved, either by perfection of existing machinery or by devising new equipment, is extremely probable.

✦ ✦ ✦

ANOTHER problem as yet facing the technicians in the industry involves the back of the die. The European fine die used a wide opening in the back. This is satisfactory as long as the die is used in the fine sizes, but, when it is resized to a larger opening and subjected to the greater pressure of larger wire, it exhibits a tendency to crack out in the back. If the American die industry can achieve a narrow shape in the back which will support the bearing after the die is recut to a larger size, it will have made a definite improvement in the art.

✦ ✦ ✦

THE achievement of a satisfactory polish or finish to the die is a phase in which further improvement can be expected. The machinery used for polishing varies considerably among the different shops and it would be difficult to say which is best suited for the job.

(Please turn to Page 142)

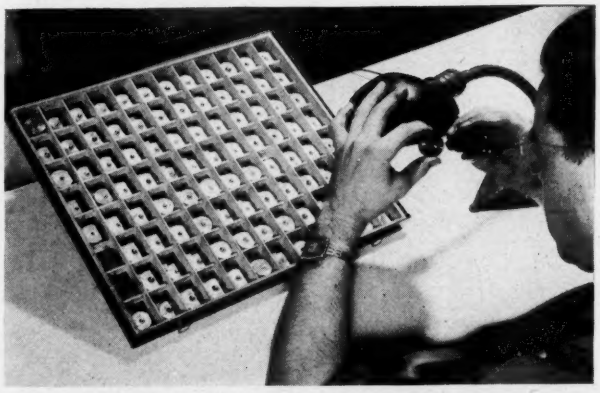


Fig. 3. The finished dies, which require four or five days to make, are carefully examined through high-powered microscopes before being shipped to wire manufacturers for use in helping to carry the fight against the Axis.

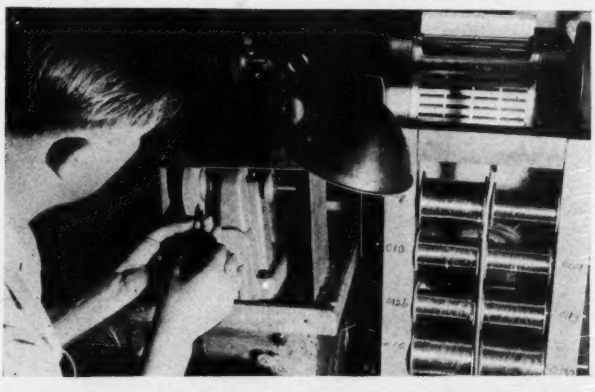


Fig. 4. The needles on the drilling and polishing machines must be reground several times an hour on emery wheels to keep the points perfectly sharp.

The Rawson Centrifugal Clutch Coupling

By J. A. Holbrook,
Asst. Supt., Washburn Shops, Worcester Polytechnic Institute,
Worcester, Mass.

MECHANICAL power transmission by means of centrifugal clutch devices has been known to industry for several hundred years. However, it was not until the start of the last decade that any basic improvement in the centrifugal clutch principle was conceived and developed.

✦ ✦ ✦

THE Rawson automatic coupling is a fundamentally different and highly adaptable clutch type coupling which is used extensively throughout the wire industry on wire drawing machines, rod blocks, twisters, cablers, closers and other wire processing machinery. It consists essentially of two integral centrifugal clutches, one of which is activated by the prime mover, and the other by the driven machine. The secondary clutch makes this device basically different from all previous designs. This feature is completely covered by U. S. Patents.

✦ ✦ ✦

THE unit connected to the prime mover consists of a spider which contains a series of pockets in which freely floating friction shoe segments are located. This unit operates within the shell of the unit which is connected to the driven machine.

These Rawson Couplings are manufactured, sold and serviced by the Syncro Machine Company, Rahway, N. J. ✦ ✦ ✦ ✦ ✦ ✦

✦ ✦ ✦

IN starting, when the prime mover reaches a predetermined speed, centrifugal force causes the friction shoe segments in the prime mover coupling unit to move outward against the inner surface of the shell of the coupling unit which is connected to the driven machine. At first, there is considerable slip between the two coupling units, which results in shockless, easy starting of the driven machine, which protects the drive. Then, as the inertia of the driven machine is overcome, its speed is rapidly accelerated until it equals the speed of the prime mover, where no further slip occurs.

✦ ✦ ✦

NORMALLY, the outer friction shoe segments (mounted in the prime mover coupling unit) are designed to transmit torque corresponding to the rated horsepower and speed of the prime mover. To compensate for overloading, the coupling unit which is attached to the driven machine is also equipped with friction shoe segments. These inner segments are usually designed for 40% of the rated torque, to take care of an overload of 40%.

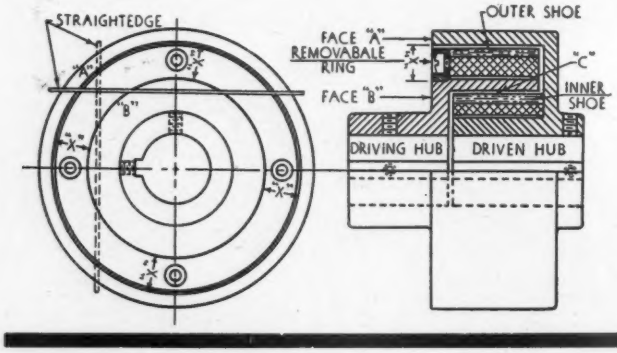
✦ ✦ ✦

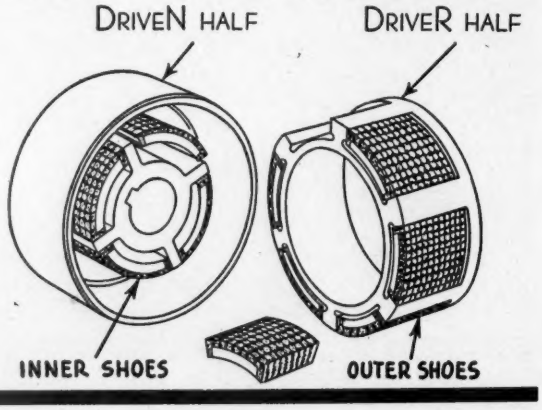
THE inner friction shoe segments are mounted in pockets in the coupling unit which is attached to the driven machine, where they also freely float. At a predetermined speed of the driven unit, centrifugal force causes the inner shoe segments to move outward against the round inner surface of the prime mover unit. The additional grip thus provided serves to compensate for overloads up to the capacity of the inner shoe segments.

✦ ✦ ✦

AT full speed, no slippage occurs as the unit has a capacity of 140% of prime mover rating. Loads greater than coupling capacity cause a momentary slippage

(Please turn to Page 138)





Uses For Fine Steel Wire

AN interesting compilation of the uses of fine steel wire has been made by the Seneca Wire & Mfg. Company of Fostoria, Ohio. In compiling this data it was found that fine steel wire was a development of the wire drawing process which has taken centuries to bring to its present point of efficiency.

✦ ✦ ✦

ORIGINALLY steel wire was fabricated by a forging process. Later on drawing this wire through a die was developed and from that point on the progress has been very rapid until the development of the tungsten carbide die which has practically revolutionized the production of steel wire.

✦ ✦ ✦

THE development of this die made it possible to introduce high speed drawing machines for the finer sizes of wire which in turn lowered the cost of the finished wire and consequently broadened the market and the possibility for use.

✦ ✦ ✦

THE compilation developed that fine steel wire is used for the following purposes:

Armature Winding
Axles
Bags
Bails
Bale Ties
Baskets
Bed Springs
Belts
Bird Cages
Bobbins
Bolts, Nuts and Rivets
Bonnet and Hat Frames
Boxes
Brads
Braids
Brushes and Brooms
Buckles
Cables
Cages
Chains
Chucks
Clamps
Clips
Cloth
Clothes Line
Coat and Hat Hangers
Conduit
Cord
Cotter Pin
Fences
Umbrella Frames
Fuses
Gates
Handles
Hooks and Eyes
Lamp Frames
Mats
Mattresses
Muzzles
Nails
Needles
Netting
Novelties
Ornamental Work
Pans
Paper Clips
Pins—Cotter
Hair
Safety
Racks
Reeds
Reels
Ribbon
Rings
Rods
Rope
Screens—Fireplace
Insect Wire Cloth
Screws
Seals
Shapes and Forms
Spikes
Springs—Automotive
Bed
Coil
Flat
Hair
Helical
Spiral
Valve
Woven Wire
Staples
Stays
Straps
Stretchers
Tacks
Tools
Traps
Trays
Threads
Washers—Lock
Welding
Wire Cloth
Aircraft
Signal Corps
Balloon Barrage
Artificial Flowers
Tire Beads
Barbed Wire
Bookbinder
Border
Bottling
Box Binding
Button Hook
Button
Card Wire
Car Seal
Concrete Reinforcement
Corset
Elevator
Florist
Fuse
Guy
Heading
Heddle
Hoops
Music, Piano, etc.
Picture Cord
Rock Fastener
Sash Cord
Shoe
Signal
Spoke
Stove
Stove Pipe
Tack
Tag
Ties
Toys

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300 Main Street THE WIRE ASSOCIATION Stamford, Conn.

✦ GOVERNMENT WIRE PRODUCTION INFORMATION ✦

Brass for Shoe Eyelets to be Permitted

THE War Production Board and its Office of Civilian Requirements have announced jointly that arrangements are in process to permit reversion of functional shoe eyelets from steel to brass.

✦ ✦ ✦

PROSPECTS of moderate improvements in the supply of brass make it desirable to plan an orderly return to the use of brass strip in the manufacture of shoe eyelets, in order to utilize this material effectively in this essential use as it becomes available.

✦ ✦ ✦

USE of steel eyelets, particularly in white shoes where rusting problems are acute, has never been satisfactory to manufacturers, retailers or the consuming public.

✦ ✦ ✦

THE first step contemplated in this program is to allow sufficient brass in the first quarter of 1944 to permit the manufacture of white eyelets. It is hoped that the production cycle involved will make it possible for shoe manufacturers to begin using eyelets made from brass before the end of that quarter.

✦ ✦ ✦

DURING the second quarter, it is hoped that sufficient brass strip can be allocated to permit reversion to brass of 50 per cent of all eyelets for shoes, including white eyelets. Whether this will in fact be possible depends not only on the supply of brass, but also on requirements for other essential uses which may develop.

✦ ✦ ✦

UNDER the program, full reversion should be completed during the third quarter, if the materials situation develops favorably, but WPB warned that there will be an appreciable time lag between allocation of the strip brass and delivery of the finished brass eyelets to shoe manufacturers.

✦ ✦ ✦

IT is possible that unexpected demands for copper at a later date may make it necessary to modify the program, requiring a return to the use of steel.

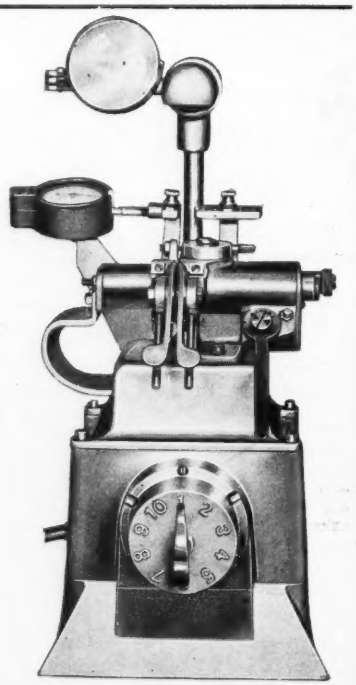
MICROMETER PRECISION MICRO-WELD TRADE MARK REG. U. S. PAT. OFF.

CONTINUOUS IMPROVEMENT

MICRO-WELDERS with dial indicating annealing attachments are now available for high carbon wire.

There is positive control of annealing temperature and already hundreds of these special MICRO-WELDERS are proving their dependability and satisfactory performance with leading manufacturers.

Model E.-I-S Welder Capacity .010 to .062" high & low carbon wire.



MICRO PRODUCTS COMPANY

20 NORTH WACKER DRIVE, CHICAGO 6, ILL.

Telephone, State 7468

STEPS also are being taken to release frozen stocks of brass eyelets now in the hands of manufacturers.

✦ ✦ ✦

Vanadium Restrictions Removed

THE War Production Board recently removed restrictions on the delivery and sale of vanadium with the issuance of General Preference Order M-23-a, as amended. Hereafter, however, vendors of more than 500 pounds of the material in any month will be required to report all sales during that month on Form WPB-3454.

✦ ✦ ✦

THIS action was made possible by the fact that production and importations of vanadium now exceed the amount used.

✦ ✦ ✦

CONTROLS of melts of alloy steel (the manufacture of which consumes 98 per cent of all vanadium used) still remain in force. WPB officials pointed out that in the past four months no allocation request has been refused on the basis of end use.

✦ ✦ ✦

W.P.B. Field Offices to Handle Appeals On Metal Strapping Restrictions

APPEALS from restrictions on metal strapping for shipping containers may now be filed in regional field offices of W.P.B., according to an announcement released January 7, 1944.

✦ ✦ ✦

HERETOFORE such appeals had to be filed with the Containers Division of W.P.B. in Washington. Appeals may be in the form of letters but must be filed in triplicate and explain fully the grounds for appeal.

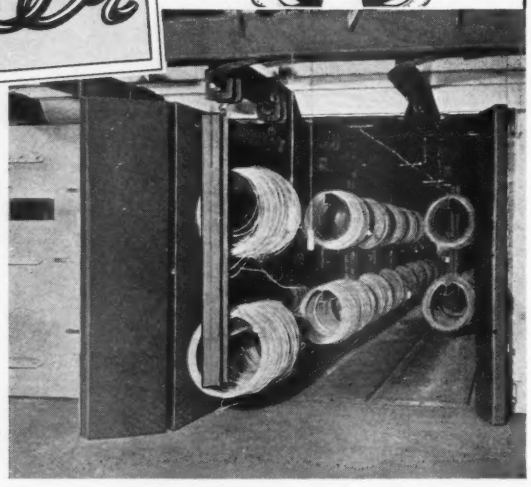
✦ ✦ ✦

THIS change has been made for the purpose of decentralizing appeals procedures in the Containers Division, and was effected by amending Conservation Order M-261.

(Please turn to Page 124)

Your Forming Rolls tell the Story!
ROEBLING FLAT WIRE pays off when it is formed, punched, sheared or drawn . . . pays off in the form of faster production, fewer rejects. It's the effect of holding dimensions *to strict tolerances,* of seeing that steel analysis is *right,* temper and uniformity *closely controlled.*
And flat wire is just one of a family of Roebling Wire Products that gets this custom-tailored treatment. With steel-making facilities, trained manpower and special production tools, we are ready to deliver either round, shaped, flat wires or strip steel that will help your fabricating machines do a better job.
JOHN A. ROEBLING'S SONS COMPANY
TRENTON 2, NEW JERSEY
Branches and Warehouses in Principal Cities
STRIP STEEL
ROUND
SHAPED
FLAT WIRES
JAR ROEBLING
ROEBLING
PACEMAKER IN WIRE PRODUCTS
ROUND AND SHAPED WIRE • ELECTRICAL WIRES AND CABLES • AERIAL WIRE ROPE SYSTEMS • COLD ROLLED STRIP • HIGH AND LOW CARBON ACID AND BASIC OPEN HEARTH STEELS • FITTINGS • WIRE CLOTH AND NETTING • WIRE ROPE AND STRAND AIRCORD, SWAGED TERMINALS AND ASSEMBLIES • SUSPENSION BRIDGES AND CABLES

It's the new ROSS Wire Baker



..that shortens the baking cycle

A modern "must" for Wire and Rod Mills that need increased production and improved quality of product. The Ross Baker circulates high temperature air, clean and free from all products of combustion, to greatly speed up drying. Troublesome rusting and irregular lime coating are eliminated—quality is improved. Air Heaters use any oil or gas fuel available.

Ask Us About Revamping Your Present Equipment

Before recommending a new baker our engineers will determine whether your present unit can be revamped. Write our nearest office.

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Main Office—350 MADISON AVENUE., New York, N. Y.

CHICAGO—201 North Wells Street DETROIT—12953 Greeley Avenue

ROSS ENGINEERING OF CANADA, LIMITED, Dominion Square Building, Montreal

Government Wire Production Information

(Continued from Page 123)

Order Restricting Molybdenum Revoked

THE War Production Board has removed restrictions on the delivery and sale of molybdenum, with the issuance of General Preference Order M-110, as amended. Hereafter, however, vendors of more than 2,000 pounds of the material in any month will be required to report all sales during that month on Form WPB-3453.

✦ ✦ ✦

THIS action was made possible by the fact that production and importations of molybdenum now exceed the amount used.

✦ ✦ ✦

CONTROLS over melts of alloy steel (the manufacture of which consumes 95 per cent of all molybdenum used) still remain in force. WPB officials pointed out that in the past four months no allocation request has been refused on the basis of end use.

✦ ✦ ✦

WITH the issuance of M-110, the WPB revoked Supplemental Order M-110-a.

✦ ✦ ✦

Brass and Bronze Allowed for Manufacture of Nuts

MANUFACTURERS have been granted permission by the War Production Board to use either brass or bronze in making nuts for several categories of valves.

✦ ✦ ✦

THIS permission was granted in specifications for nuts for packing gland flange bolts or studs in manufacturing iron gate valves and iron globe and angle valves. Previously, only carbon steel had been permitted for these purposes, the Shipbuilding Division of WPB said.

✦ ✦ ✦

THE use of brass or bronze also is allowed in the manufacture of nuts for attaching the swing

check disc to a hinge or arm of an iron check valve. Previously, only carbon steel or malleable iron was permitted for this purpose.

✦ ✦ ✦

THE changes are included in amendments to Limitation Order L-252, issued January 6, 1944.

✦ ✦ ✦

WPB Increases Allotment of Steel for Rings and Binder Parts

THE use of metal in the manufacture of rings and binder parts for looseleaf and blank books or covers has been increased for 1944 from 30 per cent to 75 per cent of 1941 usage, the War Production Board Printing and Publishing Division has announced.

✦ ✦ ✦

IT was estimated that the allotments in the first quarter of 1944 will approximate 1,100 tons of iron and steel and that in subsequent quarters 1,600 tons will be allotted, whereas usage last quarter was less than 650 tons.

✦ ✦ ✦

IN normal times, the loose-leaf binder industry's sales total about $12,000,000 annually. Approximately 70 per cent of production went into the Army and Navy orders in 1943. In order to meet demands, it was necessary for all plants to operate as near capacity as possible, whether they were situated in short labor markets or not.

✦ ✦ ✦

Restrictions Removed On Tungsten

THE War Production Board on Dec. 30, 1943 revoked General Preference Order M-29, and thereby removed restrictions on the delivery and sale of tungsten. A steadily increasing stockpile of this material plus an excess of supply over use has made this action practicable, WPB officials explained.

Modern Goliath at Work..

Unloading a Liberty ship at an English seaport . . . *Wide World Photo.*

KEYSTONE Wire

With the skill and strength of a modern Goliath, multi-ton war "packages" are unloaded with ease from cargo ships. Strong wire cable supports the load as it is swung safely by crane from ship to shore . . . one of many herculean war tasks performed by products made from wire.

But while our industrial wire production is today devoted chiefly to war necessities, we are preparing for the postwar market that lies ahead. New, improved techniques and vastly increased facilities will help materially in meeting the tremendous pent-up civilian demand as soon as Victory is here.

KEYSTONE STEEL & WIRE CO.
PEORIA, ILLINOIS

Special Analysis Wire for All Industrial Uses

SAMSON SPRING WIRE

Put idle SCRAP to work . . . help speed Victory!

Wire Tests and Specifications

(Continued from Page 113)

pose, and it is generally tacitly assumed that if wire for example is supplied against a certain specification it will behave in the same way wherever it is produced. This of course is not true. One case has already been cited, namely, the heat treated and cold drawn wires supplied for the Mount Hope Suspension Bridge.

VERY clearly similar physical properties for which tests have usually been made can be obtained by different methods of production, and it is essential therefore to indicate in addition to the physical tests the general method of production to be adopted expressed in terms such as Hard Drawn, Annealed, Heat Treated, and so on.

✦ ✦ ✦

NO specification should however define the precise method of production, such as the number of holes the wire is to be drawn, the points at which heat treatment is to be given, and details of this character. These must be the responsibility of the manufacturer, and he should only be asked to produce wire of the general character indicated capable of standing the tests laid down. Above all, a specification should be simple and should only include those tests which are definitely necessary to insure the suitability of the wire for the purpose for which it is intended. A bad or over-elaborate specification may have the following effects:—

(1). Perfectly good wire will be rejected.
(2). An expensive method of production may have to be adopted to secure the tests required, which is unnecessary for the purpose in view.
(3). The method of production required to give the tests may not be the best for the use to which the product is to be applied.
(4). The wire may comply with the tests laid down and be quite useless for the purpose for which it is intended.

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ANY number of cases could be cited in which one or other of these defects have operated, and this is particularly the case in relation to wire supplied for war purposes. Specifications drawn up by central bodies such as The British Standards Institution and the American Society for Testing Materials are usually sound and well drafted, but the methods by which they are subsequently used by Consultants and Government Departments frequently leaves much to be desired. Specifications drawn up by consultants and perhaps also large users of wire are frequently extremely bad and often exhibit a deplorable lack of knowledge of the physical properties of the material. A case in point was a specification for Soft Annealed Binding Wire issued by a firm of consultants in which the twists on 6″ were specified within the limits 105/122. This of course implies that only wire having twists within the above limits could be suitable for the purpose, which is of course quite idiotic.

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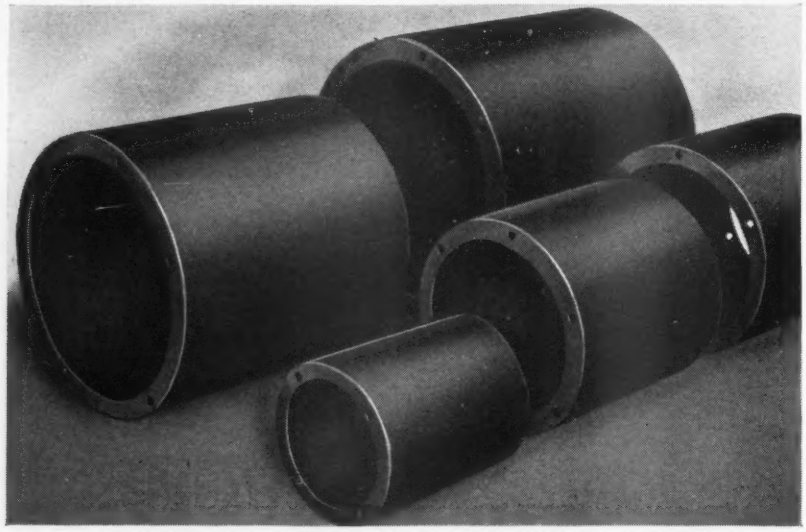
SPECIFICATIONS for Tyre Bead Wire, many of which have originated in America are also de-



A New Plant to Serve You

Flanged steel drums or traverses* will soon be manufactured at the Garrett Division plant of the Hubbard Spool Company.

Drums will be available in all standard sizes or will be made to your specifications. Your inquiry is invited now for detailed information concerning drums and delivery.

*under license arrangement with the Western Electric Co., Inc.

HUBBARD SPOOL COMPANY
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Since 1912, manufacturers of wire drawing, annealing, and shipping spools and reels.

fective. It appears that these specifications are drawn up after a large number of examinations have been made on wire received from the manufacturer, probably extending over a period of years, and the best values obtained from purely empirical tests are incorporated in the form of a specification not as optimum values with suitable tolerance for manufacture, but as minimum requirements which are of course impossible to obtain without rejection of substantial quantities of otherwise suitable material. Moreover, certain of the tests included in the specifications seem quite irrelevant.

✦ ✦ ✦

THERE is also a tendency in what may be termed private specifications, to lay down values of quantities which are quite outside the manufacturers' control, and are an inherent property of the material. For example, some specifications lay down the value of the coefficient of linear expansion, specific gravity, Young's Modulus and Limit of Proportionality. It may be a specification of this character which caused a manufacturer to send an enquiry to a certain technical paper as to how he could obtain Young's Modulus. The answer that it could be obtained at any high-class stationers was to say the least of it surprising. While it may be desirable for reference purposes that specifications should include information on the inherent properties of the material, such information should be included as an appendix, or if it is inserted in the body of the specification, it should be made clear that it is there for information only.

✦ ✦ ✦

OVER specification is another evil with which the Wire Manufacturer frequently has to contend. For example, a complete chemical analysis and a tensile strength may be laid down, and it is either impossible to obtain the tensile strength from the analysis set out, or it can only be obtained by using a method of production which leaves the wire in a thoroughly unsatisfactory condition.

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FOR example, a certain specification lays down carbon limits 0.75/0.85% and states the wire shall be Bright Drawn to a tensile strength of 70/80 tons per square inch. Again, tensile strengths or hardness numbers either Rockwell, Brinell or both are sometimes given, and it is found that none of them agree.

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IT is perhaps insufficiently realised that conversion scales between hardness numbers and tensile strengths which apply to normalized or annealed material, do not necessarily apply in the case of Hard Drawn Wire.

✦ ✦ ✦

IT is probable that most Wire Manufacturers have been irritated at one time or another by

(Please turn to Page 128)

● From the fighting front, all the way back to the production line, wire has innumerable war jobs to do—tough tasks that show up just how good modern wire can be made. Cortland Wire is in service on many fighting and production fronts, performing essential tasks that generally are unseen and unsung.

Whether it is for armor wire, wire cloth for airplane air filters, aircraft engine casting pins, or wire for the common nail, performance is the real measure of wire value. And on the basis of performance, Cortland Wire has been exceeding the strictest specifications—the result of Cortland's more than 70 year experience in making America's finest wire and wire products.

WICKWIRE BROTHERS, INC.
CORTLAND, NEW YORK

Cortland Brands

WICKWIRE IS WARWIRE

Life at sea does things to electric cable—and finely-drawn, tough, corrosion-resistant steel wire, woven in a special basket-weave pattern, protects cable, giving it strength and flexibility to "take it." Supplying this wire is another duration job assigned to Wickwire Brothers, Inc., because of a peacetime reputation for making highest-quality wire.

Wire Tests and Specifications

(*Continued from Page 127*)

receiving an order to an elaborate specification of tensile strength, elongation, torsions, Brinell Numbers and narrow tolerances, and then on enquiry have found out that the wire is to be used, for example, for the manufacture of handles for Paint Cans.

✦ ✦ ✦

IT is for such purposes as these that simplification is necessary, and there is very little doubt that an adequate specification for all Mild Steel Wire, Bright or Galvanized, supplied for general purposes such as Fencing, Cable, Armouring, Concrete Reinforcement, and so on, need only comprise a statement of minimum tensile strength and a Wrapping Test On and Off the wire's own diameter.

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THESE notes have been written with the object of directing thought to this important subject of Wire Tests and Specifications. Many of the statements may be regarded as heretical in the extreme, but nevertheless it is maintained that a good deal of debunking is necessary.

✦ ✦ ✦

FINALLY, when considering physical tests on wire or any other material, it is worth keeping prominently in our minds the words of **Professor Sir A. S. Eddington:—**

"Whenever we state the properties of a body in terms of physical quantities, we are imparting knowledge as to the response of various metrical indicators to its presence, and nothing more . . . "

✦ ✦ ✦

Folder on Die Machinery

THE Carboloy Company, Inc., Detroit 32, Michigan, has reprinted a two-page advertisement in folder form which illustrates and describes its full line of equipment for finishing and servicing all sizes and shapes of carbide wire drawing and extrusion dies. A copy of this may be had for your files upon request.

✦ ✦ ✦

Issues Bulletin on Carbottom Furnaces

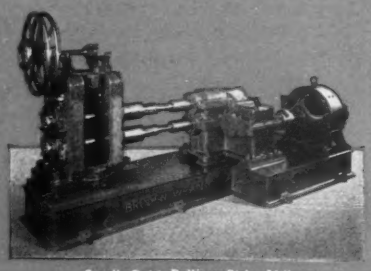
SURFACE Combustion, Toledo 1, Ohio, has issued a new illustrated bulletin SC-115, showing an installation of six recirculating, reversing type convection carbottom furnaces used for heating armor plate steel. Besides giving dimensions, capacity, temperature ranges, there is included a useful chart-form conversion table for pressures. Copies will be sent upon request.

✦ ✦ ✦

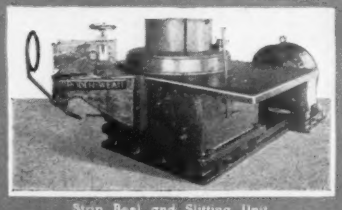
Catalog of Technical Books

THE Chemical Publishing Company, Inc., 26 Court Street, Brooklyn, 2, N. Y., has published a 1943-1944 catalog of its books on chemistry, engineering, mathematics, metals, and metal working, etc., which it will be glad to send to interested persons.

WEAN-BRODEN



Small Cold Rolling Strip Mill



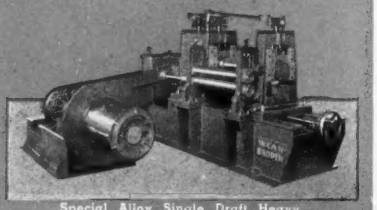
Strip Reel and Slitting Unit

THE Wean Engineering Company, Inc., have long been recognized as specialists in sheet, strip and tin mill equipment . . . The Broden Construction Company specializes in the manufacture of narrow strip and wire mill equipment.

With the extended facilities of The Broden Construction Company as a subsidiary of The Wean Engineering Company, Inc., it is now possible to serve the steel industry more effectively.

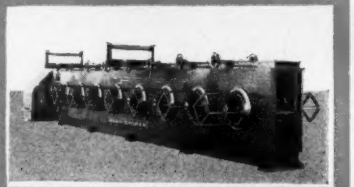
COLD ROLLING MACHINERY
For 36" Wide Material and Narrower
Mills • Reels • Slitters • Levelers • Coilers
Edgers • Scale Breakers • Shears
Scrap Ballers • Continuous Pickling

WIRE MILL EQUIPMENT
Wire Drawing Machines • Patenting
Galvanizing and Tinning Take-Up Frames
Wire Flattening • Spoolers • Nail
Galvanizing and Blueing



Special Alloy Single Draft Heavy Duty Vertical Wire Drawing Block for ⅝" Round Wire

HOLMQUIST BARBED WIRE and WIRE FENCE MACHINERY



The BRODEN CONSTRUCTION Co., Inc., Cleveland, O.
A SUBSIDIARY COMPANY OF
The WEAN ENGINEERING Co., Inc., Warren, O.

"Right on the Nose"

AN illustrated booklet entitled "Right on the Nose," which explains in detail the methods of adjusting non-prescription industrial safety goggles so that workers can wear them in comfort has been published by the American Optical Company of Southbridge, Mass. Free copies can be obtained by writing the concern direct.

✦ ✦ ✦

A TRAINING film on the same subject and bearing the same title has also been produced by American Optical for goggle fitters. This new sound motion picture 16 mm. film is available on a free loan basis, and prints can be secured direct from the company.

✦ ✦ ✦

New 160 Page Wire Rope Buyers Guide

TABBED index, with contents to each section printed on each index, plus a general index, this new Buyers Guide replaces all previous editions, manufacturer says.

SIXTY pages contain helpful information on conservation and care of wire rope.

✦ ✦ ✦

IT contains latest tables and information in accordance with new simplified practice on wire rope.

A COPY of this new catalog and wire rope Buyers Guide, known as G-15, may be obtained by writing your request on company letterhead to Macwhyte Company, attention **Mr. Jessel S. Whyte,** President, Kenosha, Wisconsin.

✦ ✦ ✦

New Issue of Cleveland Crane Graphic

THE Cleveland Crane & Engineering Co., 1129 East 283rd Street, Wickliffe, Ohio, has just mailed a copy of its latest issue of the Cleveland Crane Graphic, Vol. 2, No. 3. This is illustrated with pictures of various installations of their overhead material handling systems, their 250 ton powerhouse trolley, their Steelweld Press for metal forming, magnet cranes, pipe and rod carriers, transfer bridges, and other timely mechanisms. A copy may be had for the asking, if interested.

WIRE and CABLE
Processing
EQUIPMENT

COMPLETE LACQUERING SYSTEMS
•
DRYING ROOMS
•
LACQUER POTS
•
STOP WIRE SHUTOFFS
•
SPECIAL PROCESSING OVENS FOR WIRE AND CABLE

REEL STANDS UNWIND
•
REEL STANDS WINDUP

FREE ENGINEERING DATA
Among other vital information in this book is a blueprint of a typical cable-oven installation, of interest to all wire and cable processing men. Send today for your free copy.

The
INDUSTRIAL *Oven Engineering* COMPANY
Engineered Industrial Ovens • Special Handling Equipment • Contract Engineering
11621 DETROIT AVE. CLEVELAND 2, OHIO

A Review of Recent Wire Patents

No. 2,335,868, SOLUTION AND PROCESS OF TREATING METAL, patented December 7, 1943 by Herman J. Lodeesen, Royal Oak, Mich., assignor to Parker Rust Proof Company, Detroit, Mich.

This patent includes a method of coating ferrous metal surfaces by applying thereto a solution of a coating phosphate which is non-oxidizable by permanganate, this solution containing permanganate, the MnO_4 in the solution being from .0005% to .005%, maintaining the pH of the solution above equilibrium.

✦ ✦ ✦

No. 2,335,930, COATING WIRE, patented December 7, 1943 by Orville F. Freeland, North Muskegon, and Jay J. Yopst, Muskegon, Mich., assignors to Anaconda Wire & Cable Co., New York, N. Y., a corporation of Delaware.

For applying a thin film of superpolyamide, the inventors contact the wire with a liquid precipitated aqueous suspension of fine particles of superpolyamide stabilized with a small proportion of sodium lauryl sulphate to form a uniform coating of the suspension over the wire, these particles being so fine that they are not macroscopically distinguishable, and heating the coating of the suspension to evaporate the liquid therefrom and to a temperature of from 500° to 600° F. to melt the particles together to form a homogeneous coating of the superpolyamide about the wire.

Complete Descriptions and Drawings of Patents May Be Had for 25 cents; outside United States and Canada, $1.00. Address, Wire & Wire Products, 300 Main St., Stamford, Conn.

No. 2,336,071, TREATMENT OF METALS, patented December 7, 1943 by Wilfred James Clifford and Henry Heward Adams, Brentford, England, assignors to Parker Rust-Proof Company, Detroit, Mich., a corporation of Michigan.

A rust proof composition is provided comprising an acid phosphate coating solution containing an organic compound which contains the nitroso group, the compound being dissolved in the solution in an amount that accelerates the coating action of the solution.

✦ ✦ ✦

No. 2,336,072, TREATMENT OF METALS, patented December 7, 1943 by Wilfred James Clifford and Henry Heward Adams, Brentford, England, assignors to Parker Rust-Proof Company, Detroit, Mich., a corporation of Michigan.

In this composition, the acid phosphate solution contains, as an accelerator, an organic compound which contains the trichloromethyl group, this compound being dissolved in the solution in an amount which accelerates the coating action of the solution.

✦ ✦ ✦

No. 2,336,219, ELECTRICAL CONDUCTOR, patented December 7, 1943 by George R. Brown, Newark, N. J., assignor to Western Electric Company, Incorporated, New York, N. Y., a corporation of New York.

About the wire is insulation next thereto consisting of a layer of normally solid and non-charring superpolymeric insulating material selected from the class consisting of superpolyamids, superpolyesters and superpolyolefines directly on the wire, with a seamless combustible sheath of felted paper pulp fibers over the layer, and a coating of weatherproofing material on the gross outer surface of the sheath.

✦ ✦ ✦

No. 2,336,237, ALLOY PROCESS, patented December 7, 1943 by Alexander L. Feild, Towson, Md., assignor to Rustless Iron and Steel Corporation, a corporation of Delaware.

This process of providing stainless steel alloys includes preparing a bath of austenitic grade ferrous metal comprising substantial amounts of chromium and nickel, and introducing into the bath, in the presence of a limy finishing slag, a quantity of columbium oxide and a ferrosilicon reducing agent as a metal finishing step.

✦ ✦ ✦

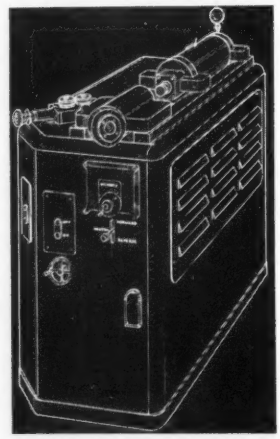
No. 2,336,975, SPRING STRUCTURE, patented December 14, 1943 by Vito Asaro, Detroit, Mich., assignor to L. A. Young Spring & Wire Corporation, Detroit, Mich.

The Combination You've Often Wanted

·MOSLO·

LABORATORY WELDING ROD EXTRUSION PRESS AND WIRE FEED UNIT

Also made to extrude powdered metals, carbon, plastics.



Here is a 12-ton laboratory type hydraulic unit suitable for duplicating conditions of actual production (10,000 lbs. per square inch pressure) . . . Comes complete, with extrusion die-head . . . Ready to set on your floor, connect to your power line and start producing . . . Hydraulic and electrical controls at operator's fingertips . . . Welded steel construction . . . A smooth-working, efficient unit . . . Can be delivered in twelve weeks under proper priorities . . . Full information on request.

MOSLO MAKES EVERYTHING FOR THE WELDING ROD PROCESSING PLANT

MOSLO MACHINERY COMPANY

2439 PROSPECT AVENUE • CLEVELAND, OHIO

Flat wire inner and outer frame members are provided with sheet metal strut members connecting these members together with the outer wire springs secured to the frame.

✦ ✦ ✦

No. 2,336,980, WIRE ROPE CENTER TESTING, patented December 14, 1943 by John Joseph Burke and Edwin Ernest Caspell, New Haven, Conn., assignors to The American Steel and Wire Company of New Jersey, a corporation of New Jersey.

The patent covers a method of testing a fibre center for wire ropes so as to predetermine the proper amount of compression to which it should be subjected by wire strands when laid into rope, which includes tensioning a unit length of such a center, correcting the degree of twist of this center to afford the proper angle of lay of the corded fiber constituents thereof if necessary, subjecting substantially the entire superficial area of the unit length of center to uniform, radially-applied compressive stress while under tension sufficient to bring the center to a predetermined dimension, and measuring the amount of the compressive stress.

✦ ✦ ✦

No. 2,337,556, CABLE, patented December 28, 1943 by Oakley W. Hosking, Monroe, N. Y., assignor to Composite Rubber Products Corporation, Bridgeport, Conn., a corporation of Connecticut.

A cable is provided of Monel metal wire, the surface of which is free of gas-occluding cavities, with a uniform coating of vulcanized rubber substance directly bonded to the exterior thereof; and a Monel metal tube having a surface likewise free of gas-occluding cavities surrounding the rubber coating and in contact therewith, the coating being directly bonded to the tube.

✦ ✦ ✦

No. 2,337,881, WIRE DRAWING MACHINE AND METHOD, patented December 28, 1943 by Frederick W. Gaines, 3rd, Cleveland Heights, Ohio, assignor to The Ajax Manufacturing Company, Cleveland, Ohio, a corporation of Ohio.

This assembly includes a stock gauge, a reciprocable drawing die through which the stock passes, a reciprocable feeding device adapted to grip the stock and feed the same against the gauge, and an actuating device for causing timed operation of this die and feeding device including means yieldable to permit overtravel for holding the stock against the gauge.

✦ ✦ ✦

No. 2,337,920, INSULATED CONDUCTOR, patented December 28, 1943 by James R. Patterson, Scotia, and James R. Reid and Henry A. Letteron, Schenectady, N. Y., assignors to General Electric Company a corporation of New York.

About the wire conductor is varnished sheet material consisting of a fibrous sheet varnished with the resinous heat-reaction product of a mixture of ingredients consisting by weight, of about 19 parts pentaerythritol, 60 parts cottonseed oil fatty acid, 18 parts phthalic anhydride, and 3 parts maleic anhydride, the resinous product having an acid number of about 5 and the varnished sheet material having at a temperature of 100 degrees C. a power factor not exceeding substantially 10 per cent.

No. 2,338,045, PREPARING METAL FOR DRAWING OPERATIONS, patented December 28, 1943 by William E. Leonard, Worcester, Mass., assignor to The American Steel and Wire Company of New Jersey, a corporation of New Jersey.

Wire stock is first cleaned in an acid solution, then immersed in an alkali solution, having the composition of No. 24 Oakite to neutralize residual acid on the stock, subsequently immersing the stock in a lime suspension so as to acquire a non-reacting coating of the suspensoid thereon, and subjecting the stock to a drawing operation.

✦ ✦ ✦

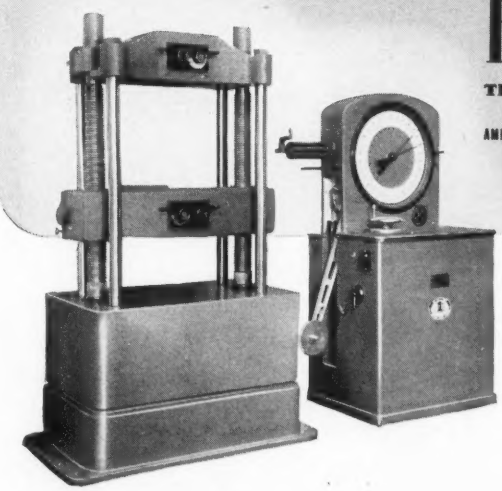
No. 2,338,049, METHOD OF COATING BASE METAL WITH TIN, patented December 28, 1943 by William Wallace Murray, Canonsburg, Pa., assignor to Continental Can Company, Inc., New York, N. Y., a corporation of New York.

More specifically, the method is applicable to coating black iron with tin and consists in electrodepositing a layer of tin on the black iron, squeezing and drying this layer and subjecting the deposited layer to cold rolling with rolls from ninety to one hundred sceleroscope hardness and highly polished, these rolls rotating at uniform speed and under pressure from seven hundred to one thousand pounds per square inch, whereby the heat incident to rolling renders the tin malleable.

PRECISION
HYDRAULIC TESTING MACHINE
with Pendulum Load Indication

MORE ACCURATE, MORE DEPENDABLE FOR PRODUCTION TESTING because:

Pendulum load indicator operates on the natural laws of gravitation. ...This principle of operation is not affected by temperature changes or subject to metal fatigue....*Write for descriptive literature and quotations.*



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TESTING MACHINES
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AMERICAN MACHINE AND METALS, INC.
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Other Products: IMPACT TESTERS • VICKERS HARDNESS MACHINES • BRINELL HARDNESS TESTERS • MEASURING INSTRUMENTS

Outstanding Personalities of the Wire Industry

Boswin Appointed Manager of Sales, Hubbard Spool Co., Garrett Division

THE appointment of **George A. Boswin** as Manager of Sales for the Hubbard Spool Company, Garrett Division, was announced recently.

✦ ✦ ✦

MR. BOSWIN will have charge of all sales covering the Hubbard Steel Traverse for Reels and Hubbard Alloy Steel Shipping Reels. These items will be manufactured at Hubbard's new plant located in Garrett, Indiana.

✦ ✦ ✦

MR. BOSWIN has been actively identified with the development, design and sale of Traverses and Shipping Reels since 1923 and for the past eight years was associated with The Stevens Metal Products Company as General Sales Manager of their Reel Division.

American Wire Fabrics Elects Granger, Creveling and Berwin

AT a special meeting of the Board of Directors of the American Wire Fabrics Corporation, **Mr. L. D. Granger** was elected a Vice President, **Mr. George H. Creveling** was elected Treasurer and **Mr. Franklin Berwin** was elected Secretary, it was announced.

✦ ✦ ✦

MR. GRANGER has long been associated with American Wire Fabrics, and is considered an outstanding steel metallurgist and engineer. Mr. Creveling is also the Treasurer of the parent company Wickwire Spencer Steel Company and the Wickwire Spencer Aviation Corporation, another subsidiary. Mr. Berwin, newly elected Secretary of American Wire Fabrics is also a member of the Board, and Secretary of the Wickwire Spencer Steel Company.

✦ ✦ ✦

THE American Wire Fabrics Company, a subsidiary of the Wickwire Spencer Steel Company is the largest producer of wire screen cloth and fabric in the world. Prior to the war, two plants were operated, one at Blue Island, Illinois, and one at Mt. Wolf, Pennsylvania. Subsequently the machinery and equipment of the Blue Island Plant were moved to Mt. Wolf where facilities were expanded. Currently the company is producing screen cloth for the armed forces and export.

✦ ✦ ✦

Carl F. Mayer Appointed Member of Heat Treating Advisory Committee

CARL F. MAYER President, The Carl Mayer Corporation has been appointed by the War

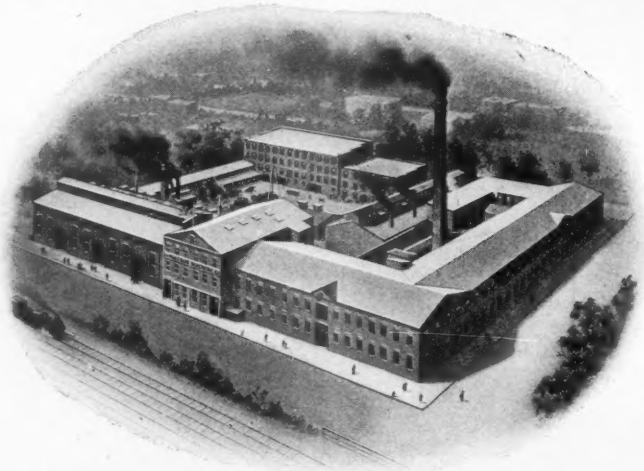
THE WATSON MACHINE COMPANY

ESTABLISHED 1845

PATERSON, NEW JERSEY, U. S. A.

ELECTRICAL WIRE AND CABLE AND WIRE ROPE MACHINERY

Stranders
Bunchers
Cablers
Closers
Armor. Machines
Tapers
Juters
Serving Heads
Compound Tanks
Saturating Tanks
Powderers and Chalkers
Capstan Sections



Let-offs
Gang-Spoolers
Re-winders
Capstan Takeups
Continuous Takeups
Heavy-Duty Takeups
Traverses
Measuring Mach's.
Testing Mach's.
Vulcanizers
Polishers
Reel Crutches

MEAS. MACH'S., TRAVERSES, REEL CRUTCHES, BUNCHERS, SMALL POWDERERS, ETC. — USUALLY CARRIED IN STOCK

LITERATURE AVAILABLE ON ALL LISTED UNITS

Production Board at Washington, D. C. as a member of the Heat Treating Equipment Advisory Committee of the War Production Board.

✦ ✦ ✦

MEETINGS will be held in Washington concerning future Armed Forces and Lend Lease equipment, Contract Cancellations and Disposition of Surplus Government Owned Industrial Furnace equipment.

✦ ✦ ✦

MR. MAYER was recently elected President of Smaller Business of America.

✦ ✦ ✦

Veteran Wire Man Retires

ALBERT J. HESS, after more than half a century's experience in the steel industry has retired from active service as manager of the cold rolled strip and springs department of the Chicago office of American Steel & Wire Co.

✦ ✦ ✦

MR. HESS first started working for the Washburn & Moen Co., one of the constituent companies going into American Steel & Wire, in May, 1890, as an office boy and clerk. His entire experience with the company has been in the Chicago office, where he progressed through the ranks as a salesman, correspondent and assistant manager, before being named manager of the cold rolled strip and springs department in December, 1928.

✦ ✦ ✦

J. H. Carter Appointed Chairman and President, Pittsburgh Steel Company

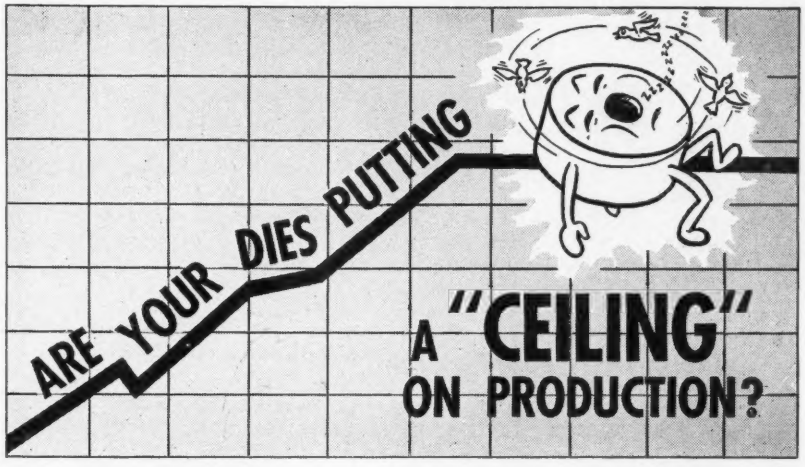
SUCCEEDING **Henry A. Roemer,** who resigned to devote his time to Sharon Steel Corporation, **Joseph H. Carter** has just been made chairman and president of Pittsburgh Steel Company, and **John Anderson,** formerly treasurer of Pittsburgh Steel, has been appointed a vice president of the company.

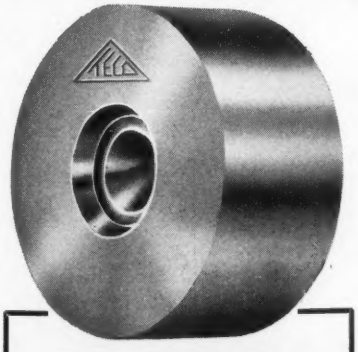
Lawrence H. Dunham

LAWRENCE H. DUNHAM, assistant manager of the Metallurgical Department of the American Steel & Wire Company, died suddenly in Pittsburgh, Pa., on January 19th.

✦ ✦ ✦

MR. DUNHAM began working for the American Steel & Wire Co. in December, 1916, as a laboratory assistant in the Physical Laboratory in Cleveland, which position he held until he was made laboratory director in 1919. In 1928, he was made assistant to the chief metallurgist in the Main Office in Cleveland. In October of 1937, Mr. Dunham was transferred to the Chicago District of the Wire Company as a district metallurgist and three years later was made works metallurgist at the Waukegan, Ill., Works. Mr. Dunham was made assistant manager of the Metallurgical Department in April, 1942.





WIRE and BAR DIES
EXTRUDING DIES
TUBING DIES • SIZING DIES
Also Carbide Blanks, Tools, Bits, Reamers and Forming Tools

DIES can bottleneck or boost your output — because they are the "business end" of your wire machines. To a large extent, dies control the quantity, the accuracy, the finish of the wire you produce. That's why it pays to buy the best!

Get the most out of your machines — in speed, in accuracy, in smoothly-finished tonnage — by using TECO Carbide Dies. Made to extreme standards of hardness, density and uniformity, TECO Cemented Carbide has greater resistance to wear and friction . . . therefore stays on the job longer. Our engineers are glad to discuss your requirements.

TUNGSTEN ELECTRIC CORPORATION, 564 39th Street, Union City, N. J.
Branch Office: 2906 Euclid Avenue, Cleveland, Ohio.
Representative: Architects & Builders Bldg., Indianapolis, Ind.

TECO Pioneers in Tungsten Carbides for over a Quarter Century CARBIDE DIES

WPB Establishes Individual Awards Plan

Workers Honored by Labor-Management War Production Drive Committee for Contributing Ideas That Save Time and Speed Production. ✦ ✦ ✦

THE American war worker is fighting the war not only with sweat, but with intelligence. Thousands of suggestions for increasing production from workers who want to do a better job, are recorded at War Production Drive Headquarters. Those which have been put into operation in America's mines, mills, factories and shipyards already have saved millions of dollars and hundreds of thousands of invaluable man-hours.

✦ ✦ ✦

IN recognition of the tremendous potential worth of practical ideas for improving the job from the men who do the job, the War Production Board, under the leadership of **Donald Nelson**, set up a system of national honors for the suggestions which in actual industrial usage prove to be of value in increasing production. Labor-Management Committees have been established in 2400 plants in which 5,000,000 war workers are fighting the "Battle of Production." Union representatives comprise the labor half of the committees in all plants where there is a recognized labor organization.

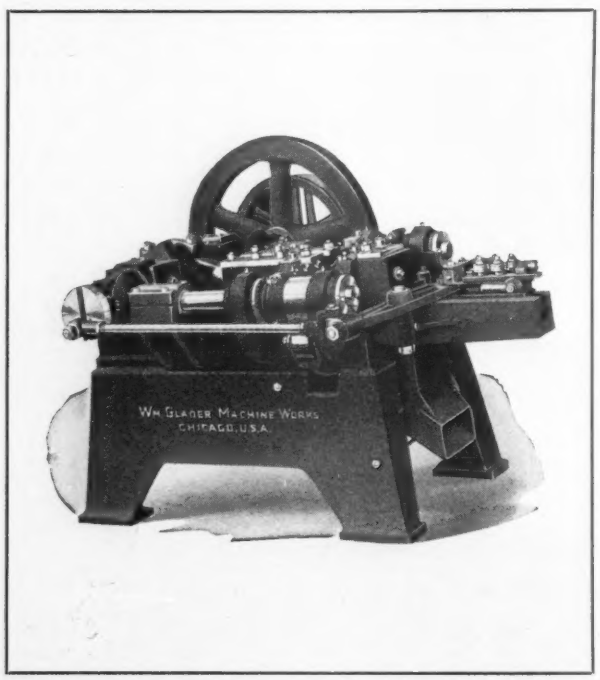
✦ ✦ ✦

THROUGHOUT the country, Labor-Management Committees have been encouraging workers to write out their ideas, and drop them in suggestion boxes conveniently located in the plant. If a worker thinks that he is doing two operations where only one is necessary, or that a substitute raw material might be more effectively used, or that a mechanical adjustment in his machine would make his work more efficient, or if he has any other ideas for improving and increasing production he can make his contribution to the suggestion box in the knowledge that his proposal will receive careful consideration.

✦ ✦ ✦

BOTH management and labor representatives on the Committees review suggestions for merit. If they are found to be useful, they are adopted in the plant. If the Committee considers the suggestion to be of enough value to have promise of broader application throughout industry, it is submitted to War Production Drive Headquarters, where it is reviewed by the Board of Individual Awards, composed of technicians and engineers in various industrial fields. Four grades of awards are given, proportionate to the breadth of application of the idea. Almost 1000 workingmen have already received recognition from the government. Of these, 14 have received the high-

GLADER HIGH SPEED WIRE NAIL MACHINE



High tonnage output, and low maintenance costs, have resulted in Glader Machines being accepted as standard equipment in every large nail mill built in the United States in the past twenty years.

Glader Machines are operating in most of the wire producing mills throughout the world.

These machines are made in eleven different types and sizes. This enables us to cover the range of sizes of nails produced with the greatest efficiency.

For further information please address,

WM. GLADER MACHINE WORKS

210 NO. RACINE AVE.
CHICAGO, ILLINOIS

est award — the Citation for Production Ideas, which is "a citation for a suggestion making an outstanding contribution to the war production program of the United States."

✦ ✦ ✦

SO that these building blocks in the country's War Production program may be available to every plant in every industry, War Production Drive Headquarters has a nation-wide exchange service. A pamphlet briefly describing the award winning suggestions is available on request, and war plants interested in specific items may write in for a fuller description, and blue prints if necessary.

✦ ✦ ✦

THE American worker likes this system. The Suggestion Box is for him a tie-line to the battlefield, and the number of Ideas for Victory submitted every day are an indication of the widespread interest the man on the production line has in meeting the country's war production quota.

✦ ✦ ✦

FOR instance, **Frank Giessen** of the RCA Division of the Radio Corporation of America presented an idea on filament tension springs. Previously, CF377-1 filament tension springs were made as follows: cut springs, remove mandrel, and form. A new setup was designed to cut and form the spring at the same time in which the mandrel was being removed. Production was increased from 200 to 750/hr. on a gross production of 1,070,000 filaments. This was a labor saving of 4.9 hrs./1000 filaments or a yearly labor saving of 5,250 hours.

✦ ✦ ✦

THIS was followed by another on assembling filaments. Previously, the MCF380A double helical filament was hand positioned, inserted, and fed into the filament winding machine. Change has been made for feeding wire into machine by air pressure through a metal chute fixture. Gross production has increased from 150 to 500/hr. on a production of 450,000. Labor saving/yr. will be 2090 hours.

✦ ✦ ✦

THREE employees in the Titeflex Metal Hose Company had ideas on the facilitation of nut inspection.

✦ ✦ ✦

THE thread gauges used for inspecting nuts consist of a handle about 4" long, and one end of which is the "go" gauging thread connected to the handle by a neck, and on the other end is the "no go" gauging thread similarly connected. All nuts were inspected holding the nut in one hand, and the gauge in the other, inserting the thread into the nut and screwing it in and out by turning the gauge. This is a laborious task, and is very tiresome on the wrist.

(Please turn to Page 136)

MORE PRODUCTION IN LESS TIME with CARL-MAYER FURNACES, OVENS

SERVING CONCERNS LIKE THESE:

American Magnesium Corp.
Aluminum Co. of America
Atlantic Wire Co.
Atlas Steel Co.
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General Steel Castings Co.
Hollup Corp.
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Pittsburgh Tool Steel Wire Co.
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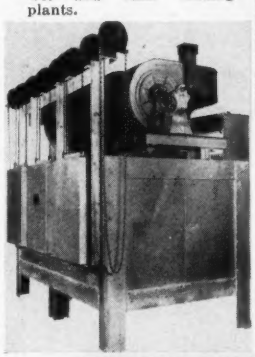
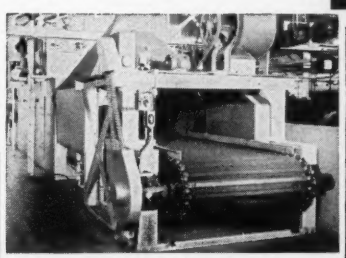
CARL-MAYER BATCH TYPE FURNACE

Carl-Mayer Recirculating Air Heater Type Batch Furnace, Gas Fired. Numerous batch type furnaces similar to this at Aluminum Co. of America, American Magnesium Corp., Thompson Products Co. and other leading plants.



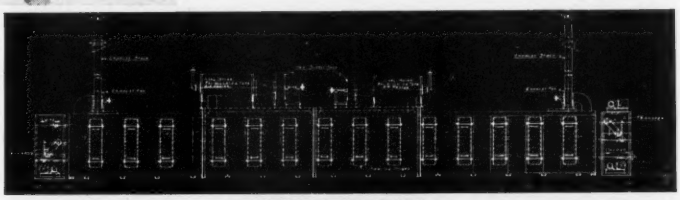


CARL-MAYER FURNACE

One of a number built for Bridgeport Brass for stress relieving Carl-Mayer Recirculating Air Heater Furnaces are widely used because of their fast heating cycle, uniformity and amazing fuel economy.

CARL-MAYER HI-SPEED ROD BAKER

The fastest rod baker built! Saves up to 50% in time and fuel. Patented Blow-Off Feature removes moisture without bumping or agitating the coils. **Patented and patents pending.**



WELDING ROD OVEN

For drying coated welding rods. Uses the "Mayer" Recirculating Gas Fired Air Heater principle and Rod Transfer Systems (patents pending).

Carl-Mayer's creative ability is making furnace and oven history. Carl-Mayer equipment is not only built for super-speed and fuel economy but has the stamina to take the severe punishment of continuous production. Write for Bulletin 141.

THE CARL-MAYER CORPORATION

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Gilron

DRAW YOUR WIRE THE MODERN WAY with

GILRON COATING COMPOUNDS

A big step forward in wire drawing. Thoroughly proven in mill practice. Makes possible wire drawing speeds heretofore considered impracticable. Increases die life, prevents scratching of wire, produces better finish and eliminates use of lime in many cases.

These coating compounds are of particular value in the more difficult operations—stainless, alloy, high carbon and welding rod wire. Multiple reductions can be drawn without re-coating.

Coatings for Drawing Stainless, Alloy, Low and High Carbon and Copper Coated Wires

Let us confer with you. Write or telephone for particulars.

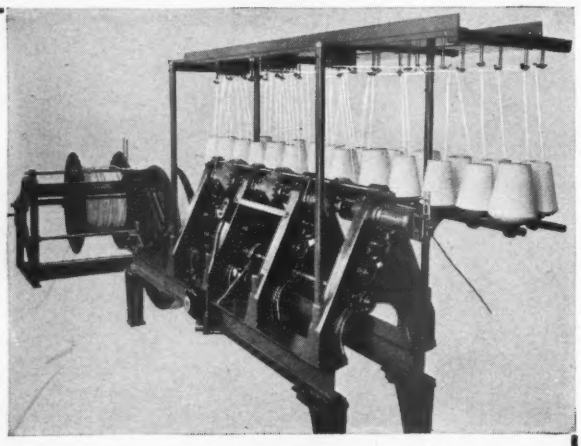
GILRON PRODUCTS COMPANY

1559 EAST 40th STREET • CLEVELAND, OHIO

Telephone HEnderson 8375

FIDELITY SINFRA MULTIPLE-HEAD HIGH-SPEED COVERING MACHINES

• • •

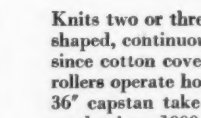


Knits two or three cotton coverings on bare wire up to #6 gauge—also flat or shaped, continuous-strip material, 1200 to 1500 feet per hour. Saves rubber since cotton coverings, impregnated, form excellent insulation. Straightening rollers operate horizontally and vertically. Each head knits one cover. 20″ or 36″ capstan take-off—separate haul-off reel stand, 40″ O.D., with traverse mechanism, 1000 lb. capacity.

Other advantages include: automatic electric stop motion on each yarn; improved knitting head and needle design; knits direct from large cones; quiet operation reduces operator fatigue.

Available in double- and triple-head types. Write for Bulletin.

Designers and Builders of Intricate, Automatic Precision Machines



32 YEARS' EXPERIENCE

FIDELITY MACHINE COMPANY

3908-18 FRANKFORD AVENUE, PHILADELPHIA 24, PA.

WPB Establishes Individual Awards Plan

(Continued from Page 135)

ALBERT DIETRICH and John Ulichney suggested and made up a board the width of the gauge handle, with the top covered with neoprene, over which the gauge handle, also covered with neoprene, could be rolled. The method for use of this device was to hold the nut against the thread of the gauge, and by rolling the gauge with the hand, up and down the board, to screw the nut held in the other hand, on and off the gauge.

✦ ✦ ✦

AMELIA SCHARTOFF further developed the idea by putting rubber wheels on the necks of the gauges between the gauging threads and the handle and rolling the wheels across the smooth surface of the bench in the same manner of the above. This latter method was particularly suited to gauging the threads on nuts which had been already put on small elbow assemblies as couplings and then plated with the assembly, after a ferrule had been soldered on to keep the nut from coming off.

✦ ✦ ✦

THE combined savings on these three suggestions in the Purchased Parts Inspection Department amounts to 29,472 man-hours per year. This method of gauging nuts is being put into effect in other departments such as Screw Machine Inspection and Small Parts Inspection.

✦ ✦ ✦

JOHN GALL of the United States Metals Refining Company, came up with an idea for the continued utilization of steel straps. Salvage of steel straps which bind various stocks of wirebars, billets, cut cathodes, etc. during transit.

✦ ✦ ✦

THE suggestor proposed that these straps be re-used over and over and as a result of his idea and experiments, straps are now salvaged by cutting some distance

from the clamp, then clamping two salvaged pieces together to form a long continuous combination of short sections.

✦ ✦ ✦

IT is estimated that one length of strap can be used three times. After allowance for the cost of labor incident to salvage is made, the net savings over a ten month period is $966.

✦ ✦ ✦

THESE are merely a few of the thousands of ideas that are helping the home-front to back up our boys on the firing line.

✦ ✦ ✦

Guide On Cutting Steels with Carbides

A VEST-POCKET "handy guide" to top performance in steel cutting with carbides (Manual GT-166) has been issued by Carboloy Company, Inc., Detroit 32, Michigan. The booklet covers the characteristics of different grades of carbides designed for steel cutting, selection of proper rake and relief angles, size of radius etc.

✦ ✦ ✦

MAJOR considerations as to machine requirements, speeds and feeds are given together with grades recommended for different classes of steels. Design and grinding of chip breakers is dealt with in detail, as is the problem of supplying coolant in proper amounts and properly directed.

✦ ✦ ✦

THE guide concludes with operating hints and "Do's and Don'ts" on carbide tools. Of particular interest are the trouble-shooting suggestions to be followed in case of tool chatter.

AD THOUGHT

ADVERTISING is a service to a magazine's readers. Methods, materials, machinery, are developing under the stress of war. Both editorial matter and advertisements keep you informed on what is happening in industry. Answer ads when they interest you, and PLEASE mention WIRE & WIRE PRODUCTS.

NEW — AND BETTER

The *Trauwood* PROCESS

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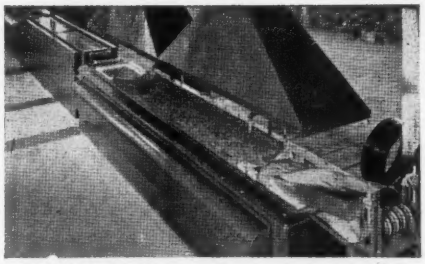
TEMPERING
ANNEALING

OUTSTANDING ADVANTAGES

- Higher and more uniform physical and fatigue properties.
- No surface decarburization or scale.
- Faster wire speeds . . . greater production.
- Equipment fully automatic and easy to operate.
- Control of heating and cooling cycles extremely accurate.
- Thermal efficiency of the process very high.
- Much finer grained structure possible.
- High quenching temperatures rapidly attained.
- Adaptable to high alloy and austenitic steel wire and strip (annealing of stainless).



Trauwood Electric Wire Tempering and Patenting Unit

The Trauwood Process, new in principle, eliminates high temperature furnaces and lead pots with their excessive maintenance costs and low thermal efficiencies. More positive temperature control is possible and quenching is done in a RISING temperature—instead of falling, as in conventional heat treating methods. The rapid rate of heating (4 to 5 times as fast as furnace heating) increases production and uniformly produces a finer grained product with higher physical and fatigue values.

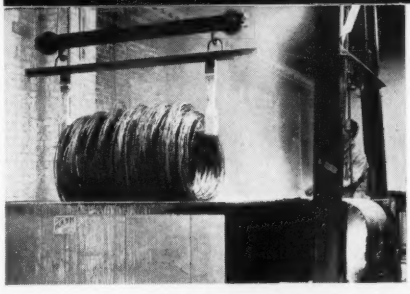
Wire and rod patented by the Trauwood Process insures easier drafting and makes heavier reductions possible. In conjunction with the Trauwood patenting equipment, pickling, coating and baking can be made continuous, eliminating expensive handling and delay, materially reducing costs as compared with ordinary methods.

Complete details of the Trauwood Process will be furnished you on request. Our engineers will help you solve your continuous wire and strip patenting, tempering, and annealing problems. Write today.

THE TRAUWOOD ENGINEERING COMPANY

1740 E. 23rd STREET, CLEVELAND, OHIO, U.S.A.

MORRISON *FLASH* BAKERS



Save Time
Cut Costs
Speed Production

Fifty-three Morrison Flash Bakers now in operation in 29 plants are proving to wire manufacturers that their cost is an investment that pays dividends because of these operational features—

1—Space saving—size of a lime tank
2—Fit straight line or circle setups
3—Reduce cleaning house fog
4—Rust-free rod
5—High capacity
6—Acid brittleness recovery of about 95%
7—Rod remains on hook
8—Only a few minutes required for baking even fine wire

Descriptive Literature Sent on Request

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Associate Companies: MORRISON ENGINEERING OF CANADA, LTD. TORONTO, ONTARIO — CARRIER ENGINEERING CO., LTD. LONDON, ENGLAND

APEX "PIC-KLEEN" PERFORMANCE DATA

(Case #46)

Type of Wire: High carbon music wire

Speed: 350 ft./min.

Reduction: From .150 to .0475 or 90%.

No. of Holes: 6

Drawn: Dry

Tensile Strength: 300,000.

Results: On this particularly difficult draw, the use of APEX "PIC-KLEEN" was mandatory in order to obtain the above noted speed.

Conclusion: The use of APEX "PIC-KLEEN" was primarily responsible for the continued successful operation of the machine in question, under above conditions.

APEX "PIC-KLEEN" COATING COMPOUND can do for you in your Mill, just what it has already done in many other Wire Mills, and on most types of wire.

A trial will convince you.

APEX ALKALI PRODUCTS COMPANY

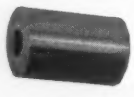
MAIN AND RECTOR STREETS

PHILADELPHIA 27 PENNSYLVANIA

MANDRELS MADE OF WILLEY'S METAL

Designed especially to meet production requirements on all types of tubing.

Mandrels made of WILLEY'S METAL insure long life and a fine finish on any type of steel, brass, copper and other alloys. Can be furnished in all standard sizes as well as to your specifications.



Many of our customers prefer to purchase nibs made of WILLEY'S METAL rough formed and do their own finishing. These can be furnished in standard sizes or to your specifications on short notice.

WRITE FOR QUOTATION ON PARTICULAR SIZES REQUIRED.

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WILLEY'S CARBIDE TOOL CO.

SOLE MAKERS OF WILLEY'S METAL

1342 W. Vernor Highway Detroit 1, Michigan

The Rawson Centrifugal Clutch Coupling

(Continued from Page 120)

which affords instantaneous mechanical overload protection for both prime mover and machine. This torsional shock absorption feature protects the drive and eliminates the need for shear pins or other protective devices.

✦ ✦ ✦

ANY reasonable capacity beyond 100% can be built into the friction shoes when desired by modifying the weight, number or size of the shoes. By judicious selection of starting and overload shoe capacities a wide range of acceleration characteristics is available for practically any type of application.

✦ ✦ ✦

THE Rawson coupling is used on equipment driven by electric motors for four fundamental reasons:

A) To protect drive, machine, or product from shock during starting or from overloading. The sliding action of the shoe elements applies torque gradually. Rawson Coupling torque varies as the square of the speed and the horse power as the cube of the speed.

B) On difficult starting applications they permit the selection of normal torque (Type K) induction motors instead of wound rotor (slip ring) or other forms of high torque motors. With proper shoe design a normal torque induction motor can be made to turn out its pull-out torque (225-250%) for starting without drawing excessive current. This torque is equivalent to that of high torque motors. This greatly reduces the original equipment investment and maintenance. Many times lower rated motors may be selected, since with the Rawson coupling, choice may be made on basis of running load instead of starting load.

C) To eliminate costly starting equipment. Since motor starts unloaded and attains speed very quickly, inrush starting current is greatly reduced and across-the-line starting may be employed.

D) To reduce the heating in motors. On equipment having high rotational inertia, the Rawson coupling permits the motor to operate at near full speed and limits the currents drawn to a predetermined value, depending on shoe design. Near full speed induction motors turn out proportionally more torque at lower current values than at low motor speeds. Heating in motor is greatly reduced as it varies as the square of the current.

National Lead Brings Out New Type of Fluxed Solder

A NEW type of fluxed wire solder, which contains flux in longitudinal grooves on the surface rather than in the conventional core, has just been placed on the market. According to the manufacturer, the product represents the first basic improvement in fluxed wire solder design since the introduction of this type of material a number of years ago.

✦ ✦ ✦

THE new material, called Fluxrite and put out by National Lead Company, 111 Broadway, New York, is said to overcome completely an inherent disadvantage of regular cored solders which supply flux and solder to the surface simultaneously. Since the flux in the new product is outside rather than inside, it liquefies and flows onto the work before the solder melts. This insures thorough and complete fluxing and results in stronger and better solder joins.

✦ ✦ ✦

IN addition to pre-fluxing, the new solder also is said to guarantee an unbroken flow of flux. Since the new product has more than one flux-filled groove, there is naturally a continuous flow at all times.

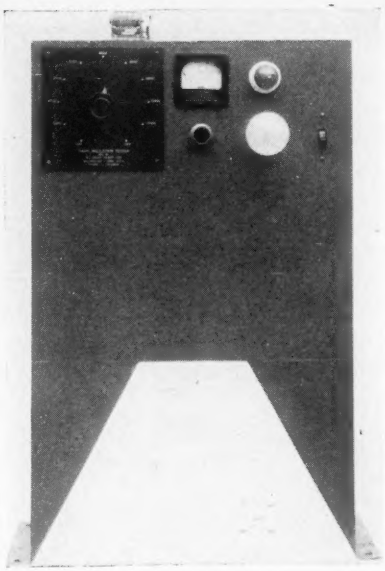
✦ ✦ ✦

AN additional advantage claimed comes from the fact that the flux supply being outside the wire, is always visible to the user and can be checked quickly and readily. Gaps or voids in ordinary cored solders are not detectable until after soldering begins.

✦ ✦ ✦

THE new product, which contains a recently developed special flux, comes in the same diameters as regular cored solder. It is available in two compositions designated as Red Stripe and Green Stripe. These designations refer to the color of the flux which has been specially dyed in each case for easy identification.

SPARKER for SYNTHETIC EXTRUSION COMPOUNDS



THIS APPARATUS WILL LOCATE DIELECTRIC FAULTS while the wire is being insulated. When breakdown occurs, the operator is notified by an audible alarm. A resettable counter gives the number of faults in each reel. By sorting out the defective reels in this operation, the majority of the resparking is eliminated. Continuous range of voltage at the electrode is from one thousand to sixteen thousand volts. The sparker is equipped with voltmeter reading in kilovolts, and automatic interlock with the takeup motor.

R. L. Davis Electric Co.

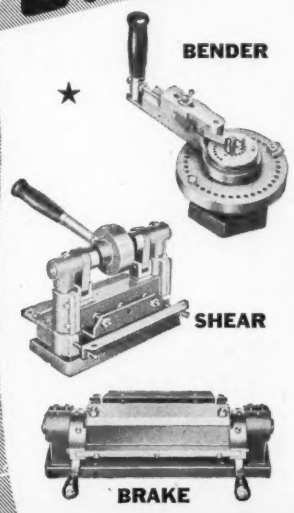
Wallingford, Conn.

"DIE-LESS" DUPLICATING

SAVES MAN HOURS AND DELAYS

DIE ACCURACY WITHOUT DIES

Send for CATALOG



DI-ACRO PRECISION MACHINES DIE-LESS DUPLICATING

O'NEIL-IRWIN MFG. CO.

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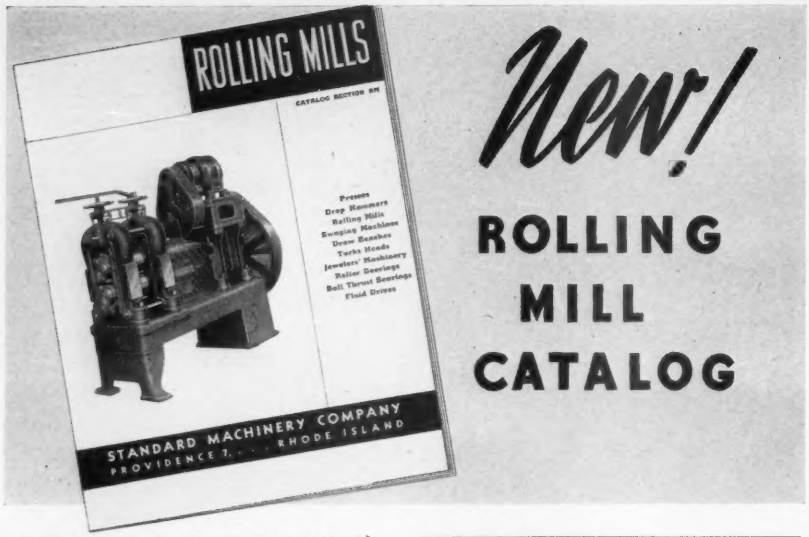

New!

ROLLING MILL CATALOG

Just off the press! "Standard" Rolling Mill Catalog RM describes the full line of "Standard" Rolling Mills—for precision rolling, strip and ingot reduction, sizing and embossing,—also for grading, cross and pinch rolling and other operations. Available with heavy duty staggered type roller bearings or plain bearings, these "Standard" Mills are carefully engineered. This new catalog will help you select a machine to fit your needs.—Call upon us for engineering recommendations.

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Please send your new Rolling Mill Catalog
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SEND FOR IT NOW!

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NILSON AUTOMATIC PRESS AND FOUR SLIDE MACHINE

FOR SWAGING, STAMPING, PIERCING, BLANKING, FORMING OF COILED METAL

WE also build machines for forming Paper Clips, Buckles, Gate Hooks, Coat and Hat Hooks, Ceiling Hooks, Wire Ears, Cable Rings, Screw Eyes, Sash Chains, Automobile Side Chains, Flat Open Link Chains, Staples, Cotter Pins, Hose Clamps, Etc., and Wire Straighteners, Wire Reels, Frame Bending Machines and Special Presses.

For Complete Details Address —

THE A. H. NILSON MACHINE CO.

BRIDGEPORT, CONN., U. S. A.

Small Diamond Die Industry

MEMBERS of the Small Diamond Die Industry Advisory Committee met with War Production Board officials in Washington, December 16, to discuss problems affecting the Industry.

✦ ✦ ✦

THE increased productivity of the small diamond die (.0015" and less in diameter) formed the main subject of discussion. This is in contrast with deliberations at earlier meetings, when ways and means of maintaining necessary quantity production and distribution required so much of the attention of members.

✦ ✦ ✦

FACILITIES are now deemed ample and sufficiently flexible to meet all likely requirements on dies needed to draw the superfine wires of all types essential to production of electronic devices and other critical war products. Resistance wire drawers do not see, in their orders, indication of the return to last summer's large requirements for dies that government agencies continue to predict. Tungsten wire drawers anticipate die requirements for 1944 several times those of 1943.

✦ ✦ ✦

ASSISTANCE tending toward the production of diamond dies of greater drawing life, with a view to economy in drawing the superfine wires, has been one of the main activities of the Diamond Die Unit of the Miscellaneous Minerals Division for the past year. It was thus possible at this meeting to offer the committee advice based on an investigation of the use of small diamond dies in the wire drawing plants, and on research made under the Small Diamond Die Project at the Bureau of Standards. A report was also read on the training of specialists to bring about an improved product.

✦ ✦ ✦

MEMBERS stated that improvement in the quality of various makes of small diamond dies, in the past six months, ranged from 50 percent to 100 percent in terms of die life. Labor conditions were indicated by members as

BELL-MINE LIME

for

WIRE DRAWING

Warner Company

BELLEFONTE DIVISION
BELLEFONTE, PA.
Sales Offices
Philadelphia-Pittsburgh-New York

much improved. Average output by operators was stated by certain members to have increased approximately 50 percent in their die plants, while improvement in the quality of workmanship continued.

✦ ✦ ✦

Wickwire Spencer Issues Special Fourth War Loan Poster

IN connection with the opening of the Fourth War Loan Drive, the Wickwire Spencer Steel Company has produced a large two-color poster especially designed and created by world famous artist Boris Artzybasheff.

✦ ✦ ✦

THE central design depicts a large American Eagle, whose wing feathers simulate war bonds, swooping down on the Axis, personified by a large snake and a rat.

✦ ✦ ✦

REPRODUCTIONS of the poster, 3 feet by 2 feet, suitable for display in stores, offices and factories, are being offered free by the company as a contribution to the promotion of the Fourth War Loan Drive. They may be obtained by writing to the Wickwire Spencer Steel Company, 500 Fifth Avenue, New York 18.

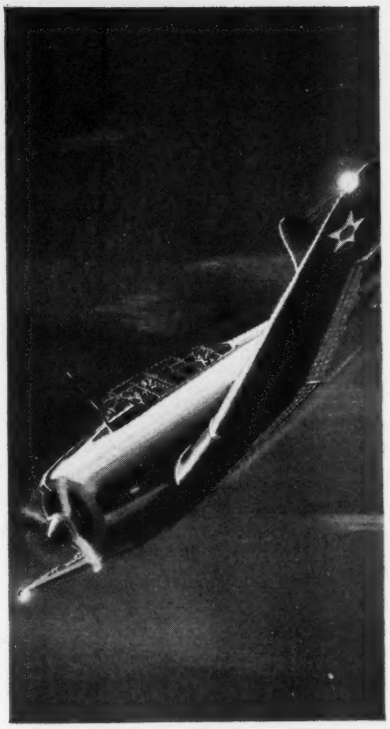
✦ ✦ ✦

Fundamentals and Applications of Electronic Control Discussed in New General Electric Publication

THE fundamentals and the various applications of electronic control are described in a new 12-page bulletin (GEA-4126) recently issued by the General Electric Company. Well illustrated, the publication explains the fundamental principles of electronic tubes and their operation, describes the construction of the well known thyratron tube, and lists the functions of eight widely used industrial-type tubes.

✦ ✦ ✦

MANY practical applications of electronic control, including rectification, resistance welding, timing, and processing operations, as well as photoelectric installations involving counting, sorting, weighing, measuring, registering, and so forth, are given.



Callite Wire aids night flight

Like ships in the night, aircraft, too, needs riding lights — red for "port", green for "starboard" Small parts on planes, winging at breath-taking speed, they are mighty important to approaching pilots, since they indicate which way the aircraft is going, prevent collisions. The Accurate Spring Manufacturing Company, of Chicago, uses Callite phosphor bronze wire for a part in the assembly of these riding lights which are sturdily made to withstand the stress of wind and weather.

This is only one example of teamwork between Callite engineers and springmakers like the Accurate Spring Manufacturing Company. You, too, can consult our wire specialists and gain the benefit of their engineering skills. Callite Tungsten Corporation, 572 Thirty-ninth St., Union City, N. J. Branch offices: Chicago and Cleveland.

Callite

FINE WIRES

BERYLLIUM COPPER • ALUMINUM • PHOSPHOR BRONZE
STAINLESS STEEL • SILVER • COMMERCIAL BRONZE
EVERDUR • BRASS (all grades) *and* SPECIAL ALLOYS

drawn to optimum properties of metal or alloy specified, prompt delivery in sizes down to .002" or smaller, cut to your exact specifications: for an infinite number of wartime applications.

ANNOUNCING —

A PREDETERMINED AND CONSTANT-TENSION PAY-OFF STAND
(Patent Applied For)

For Low or High Speeds.
Accommodates Different Size Reels.
Select Desired Tension (In Pounds).
Tension Remains Constant Throughout the Unwinding of the Reel.

No Overrunning of the Reel. No Springs.
Pay-Off Stand Also Includes a Lift for Heavy Reels.
Especially Adapted for Paying Off Wire to CV Machines.

You should have information on this new stand.

Address inquiries to:

COOK ENGINEERING CO.

265 NORTH NINTH STREET (Tel. SHerwood 2-9445) PROSPECT PARK, N. J.

Wartime
Wire for a thousand uses

Versatile Continental wire is produced in sizes from 34 gauge to ⅝ inch, in standard and special shapes . . . and in a wide range of analyses, tempers and coatings.
CONTINENTAL STEEL CORP., KOKOMO, INDIANA
(The Superior Sheet Steel Co., Canton, Ohio — a subsidiary)

CONTINENTAL STEEL CORPORATION ★ SUPERIOR WIRE

CONTINENTAL SUPERIOR STEEL

CONTINENTAL
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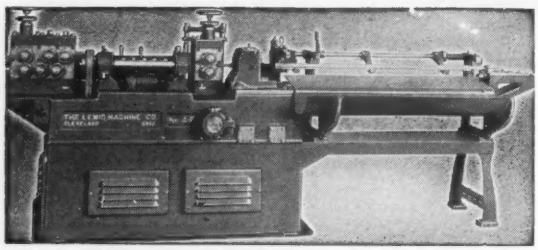
SHEETS: Black, Galvanized, Copperior, Hot and Cold Rolled, Special Coated, Long Terne, etc
WIRE: Bright Basic, Annealed, KONIK, Copper ed, Tinned, Special Manufacturer's, etc.

LEWIS TRAVEL-CUT WIRE STRAIGHTENING and CUTTING Machines

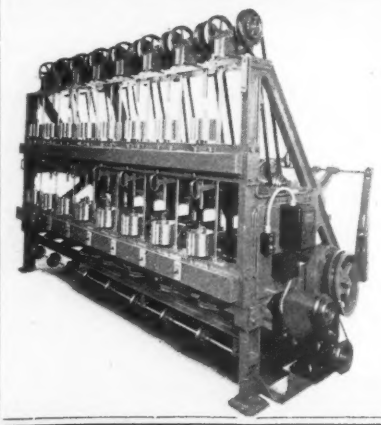


Machines for 1/16" to ¾" rod
Round
Square
Flat
Hexagon
Ferrous and Non-Ferrous

Automatic
High Speed
Heavy Duty

The Sign of Dependable Service:
WE CAN SUPPLY AND ENGINEER OUR TOOLS EQUIPPED WITH CARBOLOY CEMENTED CARBIDE

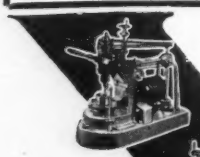
THE LEWIS MACHINE CO., 3445 E. 76 St., Cleveland, Ohio



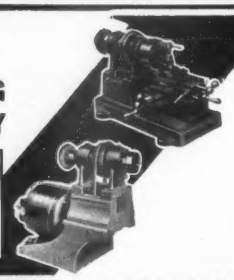
AIMCo
2D8-MBB Machine
for applying
FIBERGLAS,
COTTON AND PAPER
Each Unit Individually
Motor Driven
WIRE MACHINES FOR
Drawing, Enameling, Tinning, Spooling, Multiple Pull-outs, Rubber Covered Wire Panners, etc.

EST. 1855 AIMCo INC. 1919
"American" INSULATING MACHINERY COMPANY
517 West Huntingdon St.
PHILADELPHIA PENNSYLVANIA U.S.A.

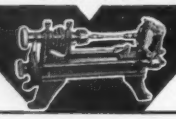
ROOS
WIRE DRAWING
DIE MACHINERY



Has proven itself by the performance of precision and quality work in almost every steel, aluminum and copper mill in the U.S.A.



LAPPING MACHINES • DIAMOND LATHES • POLISHERS
DRILLERS and GRINDERS
SEND FOR CATALOG



H&G ROOS TOOL & MFG. CO.
17-19 GROVE ST., MONTCLAIR, N. J.

Fine Die Production in the United States

(Continued from Page 119)

THE preparation of the diamond powder used to achieve a high polish is a considerable factor, as it is likewise in the drilling operation. The methods of preparing and grading the powder are generally considered as trade secrets, and graded very carefully. Good powder is of primary importance, and considerable improvements in this field will probably be made by the die industry. It can be said definitely, however, that the polish of the domestic fine die has improved immensely since the first ones were produced and considerable strides forward are being made at this time.

✦ ✦ ✦

CAREFUL selection of the diamond is another important factor in the manufacture of fine dies. The quality of stone now used in the domestic die is considerably superior to that used by European producers. These high quality diamonds, the continually improving polish and general die shape, combined with machinery for more efficient production, are the basis on which the domestic die makers rely for post-war competition with European dies. For, after all the energy and labor expended in this field, our die makers do not intend to relinquish the fine die field. In a free market competition they intend to stand on their own feet and compete successfully. If, in the exercise of foresight and vision, the government sees fit to protect the domestic fine die industry from foreign producers, it will be a just reward to the people who have worked long and hard to produce a successful fine die industry in the U. S.

Manufacturers of materials, tools and equipment for wire drawing and forming plants are constantly making improvements and additions to their lines. If you do not find the product or service in which you are interested, additional information will be supplied promptly. Simply address:

WIRE & WIRE PRODUCTS
Stamford Trust Co. Bldg.
300 Main St. • Stamford, Conn.

Benefit By Pickling This Economical Way!

SUCCESSFUL saving of acid, conservation of metal, elimination of overpickling, reduction of acid fumes... these and many other major advantages you will obtain by using OAKITE PICKLE CONTROL in your pickling operations.

BECAUSE pickling procedures and type of stock vary in each mill, your Oakite Technical Service Representative will be glad to submit recommendations or make tests to meet YOUR particular requirements. Write TODAY . . . no obligation!

OAKITE PRODUCTS, INC.
52A THAMES ST., NEW YORK 6, N. Y.

Technical Service Representatives Located in All Principal Cities of the United States and Canada

OAKITE — MATERIALS . METHODS...SERVICE — Buy Bonds for Victory

FOR FINE WIRE NO FINER LUBRICANT

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Compounded especially for high-speed machines.

Completely soluble—No fillers—Hence no clogging up of spray jets.

Extremely stable: Uniform, die-saving, trouble-free lubricity at all times.

Economical in use—Efficient in operation.

Apex "SFV" Wire Drawing Compound

•

Address inquiries to:

APEX ALKALI PRODUCTS COMPANY

Main & Rector Sts., Phila. Pa.

New Graphitic Heating Coil Developed by Heil

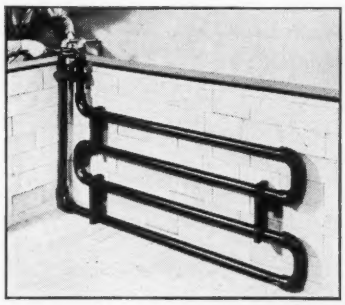
A GRAPHITIC carbon heating coil which has proved highly effective for heating tanks containing acid cleaners has been developed by the Heil Engineering Company, 12901 Elmwood Avenue, Cleveland, Ohio.

✦ ✦ ✦

THIS coil, which is made in standard sizes and in any shape for a wide variety of uses, is impervious to chemical action, is entirely non-metallic, and has a heat conductivity between that of steel and copper.

✦ ✦ ✦

IT can be used for heating pickling, electroplating and metal etching baths, and is particularly effective for muriatic pickling and other chloride processes which now require heating for best results. It is unattacked by many of the chemicals which attack metallic heating coils.



THE coils are supplied for simple heating of solutions, and steam jets of the same material are supplied for direct introduction of steam to perform both heating and agitation. Other heating equipment of the same material includes bayonet-type heaters, nozzles, heater sheaths, and electric immersion heaters. Steam coils usually operate with pressures up to 50 pounds per square inch.

✦ ✦ ✦

Gehnrich Corporation Purchased By W. S. Rockwell Company

THE Gehnrich Corporation of Long Island City, New York, has been purchased by W. S. Rockwell Company, New York, N. Y., and will be operated as the Gehnrich Oven Division of the Rockwell Company.

If you MAKE or USE WIRE YOU NEED ONE OF THE MANY

Porter Cutters

Indispensable in wire mills for sampling large wire.

In almost universal use by wire fabricators for cutting reinforcing fabric, fencing, spring wire, etc.

Useful in any plant—large or small—for all sorts of maintenance and repair work—for cutting bolts, rods, wires, rivets, wire rope, chains, or for splitting deformed or "frozen" nuts.

There is a standard Porter tool for every cutting job up to ¾" annealed bolts or ½" hardened chains. Special cutters designed to fit your industry's needs.

Send for Catalog of PORTER CUTTERS.

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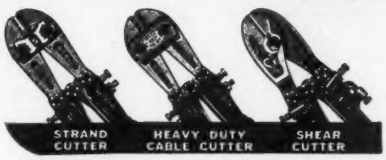
EVERETT, MASS.



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ACID PROOF CONSTRUCTION

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THE CEILCOTE CO.

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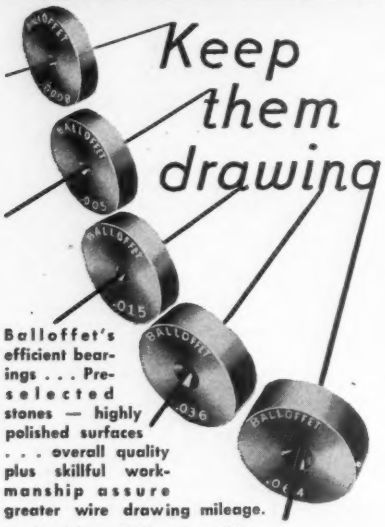
Balloffet
DIAMOND DIES



Balloffet's efficient bearings . . . Preselected stones — highly polished surfaces . . . overall quality plus skillful workmanship assure greater wire drawing mileage.
Quality Diamond Dies since 1870

BALLOFFET
DIES AND NOZZLE CO., INC.
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DIAMOND AND CARBIDE WIRE DRAWING DIES
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DIAMOND DIES
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Fort Wayne Wire Die Co.
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We Accept Used Dies for Credit
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DIAMOND WIRE DRAWING DIES
LUGINBILL WIRE DIE CO.
3410 Fairfield Ft. Wayne, Ind.

New List of Standards Published

THE American Standards Association has announced the publication of its new list of standards. There are more than 600 standards listed, of which 64 have been approved or revised since the last price list was printed (April, 1943). The standards cover specifications for materials, methods of tests, dimensions, definitions of technical terms, procedures, etc.

✦ ✦ ✦

ONE important phase of the work built up during the 25 years that the ASA has been in existence, is in the field of safety engineering. The new list includes 95 safety standards.

✦ ✦ ✦

AMERICAN Standards are constantly revised to keep up with the advances in industrial methods. This list represents the cumulative work of the past 25 years in practically every engineering and industrial field.

✦ ✦ ✦

THE complete list of American standards should serve as valuable reference material to engineers, manufacturers, purchasing agents, etc. It will be sent free of charge to anyone interested in this work. Requests should be addressed to the American Standards Association, 29 West 39th St., New York 18, N. Y.

✦ ✦ ✦

Canada Increases Barbed Wire Production

A NEW order effective immediately permitting increased production of barbed wire in 1944 was announced December 23, 1943, by **H. H. Foreman,** administrator of fabricated steel and non-ferrous metals for the Canadian Wartime Prices and Trade Board.

✦ ✦ ✦

MANUFACTURERS will also be allowed to set up consignment and storage stocks at the head of the Great Lakes to service

VIANNEY
Famous Wire Drawing Diamond Dies

These famous Diamond Dies are now produced here at moderate prices.
All sizes are in stock or made to order to your specifications
VIANNEY WIRE DIE WORKS
250 E. 43rd St., New York.
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DIAMOND DIES .0006 - .120 DIAMOND POWDER
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Wire • Tubing • Extrusion • Shell and Aircraft Extrusion Dies.
Diamond Powders In All Grades.
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Wire Drawing Diamond Dies
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DIES
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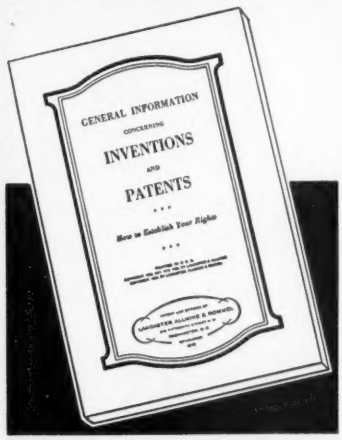
Diamond Dies for Wire Drawing
Wayne Wire Die Company
200 Pennsylvania Ave.
Hillside, N. J.
ELizabeth 2-2456

MOSSBERG
PRESSED STEEL CORP.
ATTLEBORO, MASS.
STEEL REELS AND SPOOLS



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Interesting Booklet concerning Inventions, Patents, Trade-Marks and Copyrights, together with Schedule of Government and Attorney's fees, sent free on request. Simply ask for "booklet and fee schedule."

No charges are made for preliminary advice, either in connection with patent, trade-mark or copyright cases.

Lancaster, Allwine & Rommel
Registered Patent & Trade-Mark Attorneys
438 Bowen Bldg., Washington, D. C.

western requirements during months of closed navigation.

✦ ✦ ✦

THE new order, A-1034, revokes and replaces Order A-731 but manufacturers may make barbed wire only to the following specifications: In two strands only and with No. 14 standard gauge wire in a weight of fifty-seven pounds per eighty-rod reel or fifty-eight pounds gross shipping weight. However, single strand wire may be made for the Department of Munitions and Supply. If four point barbed wire is made with barbs six inches apart it must be fabricated from No. 16 standard gauge wire.

✦ ✦ ✦

ALL other restrictions of the old order are rescinded.

✦ ✦ ✦

Bristol Announces A New Model Pyromaster

THE Bristol Company announces that they have redesigned their Pyromaster Self-Balancing Potentiometer. The new Model 431 instrument has a universal wall or flush mounting case that is considerably deeper than the previous Model 440M, and has an internal hinged panel on which are mounted pen and indicator drive mechanism, and, in the case of electric controllers, the control contacts or proportioning slide wire, or in the case of air control, the complete new convertible-type air operated control mechanism.

✦ ✦ ✦

THE Model 431 Pyromaster uses the same basic principle as previous models, providing a self-balancing round-chart recording potentiometer that has no continuously moving mechanical elements, is unaffected by vibration, and needs no lubrication.

✦ ✦ ✦

BULLETIN P1200 describes in detail the construction, operation, and application of the new design, and is available by request from The Bristol Company, Waterbury 91, Conn.

FOR SALE
1 - Small Rubber Insulating Machine.
Apply Box #361
c/o WIRE & WIRE PRODUCTS

POSITIONS VACANT
MECHANICAL ENGINEER wanted, who is experienced in design of wire mill machinery and wire insulating equipment, to work in engineering and drafting office of manufacturer of electrical conductors located in New York State. Release or statement of availability necessary. Apply Box #364, c/o
WIRE & WIRE PRODUCTS

"SPRING CONSTRUCTION FOREMAN"
Old Established Chicago Bedding Factory wants capable up-to-date man with thorough knowledge of Inner Spring Mattress Constructions. Must know how to design coils for specific requirements, have full working knowledge of crimping machines, Wells Automatic Coilers, Tempering and the handling of factory help as well as setting of piecework rates. Immediate duties are to organize and set up department, work out production systems, place machinery in perfect working order, and to make sample line of constructions to be laboratory tested and approved. No production planned until Post-War at which time we must be ready to produce at sound of the gong. State age, previous experience, background and salary wanted. Replies are invited only from qualified applicants.
BOX 365

WIRE FABRIC MACHINE DESIGNER WANTED
Long established, top rated New England manufacturer, leading builders of wire fabric machinery for many years, wants a man experienced in the design and operation of wire fabric machinery—hardware cloth, chicken wire or road reinforcement and heavier fabrics. Preferred age 30 to 45. Must be capable of drafting and designing equipment under supervision of experienced engineer. Must be eventually capable of assuming responsibility for design and sale. Knowledge of resistance welding desirable but not essential. Position permanent. Excellent opportunities for advancement.
Address Box 366, c/o
WIRE & WIRE PRODUCTS

STEEL WIRE
By MAURICE BONZEL
✦ ✦ ✦
Translated and Published by
Kenneth B. Lewis
Consulting Engineer
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Price $15.00
✦ ✦ ✦
495 pages—414 illustrations
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SEND ORDERS TO
WIRE & WIRE PRODUCTS
300 Main St. Stamford, Conn.

GEORGE D. HARTLEY
CONSULTANT & SPECIALIST
In Wire Manufacturing & Wire Forming Equipment
Development & Research
New Processes — Designing
Inventions — Patents
372 MAY ST., WORCESTER 2, MASS.

KENNETH B. LEWIS
CONSULTING ENGINEER
Wire Mill Equipment, Layout and Practice
43 Midland St., Worcester, Mass.
Phone: Worcester 5-6033

CONSULTANT AND SPECIALIST
DRAWING LUBRICANTS
Hans C. Bick, Inc.
READING, PA.

TORRINGTON
SPRING COILERS
13 models in both segment and clutch types for rapid, automatic, accurate production using wire diameters .003" to .500". Torsion and other attachments available for increasing utility of Torrington Coilers.
The TORRINGTON MANUFACTURING CO.
TORRINGTON, CONNECTICUT

MACHINERY
for
WIRE INDUSTRY
NEW ENGLAND BUTT CO.
PROVIDENCE, R. I.

CLEVELAND TRAMRAIL
Division of
THE CLEVELAND CRANE & ENGINEERING CO.
WICKLIFFE, OHIO
Leading manufacturers of
OVERHEAD MATERIALS HANDLING EQUIPMENT
for the Wire and Wire Products Industry

Army News Briefs

THE Bureau of Public Relations of the War Department, in a recent bulletin, made the following comments:

✦ ✦ ✦

A 400-ton testing machine, installed at an Army Ordnance arsenal in 1879 at a cost of $31,500, is capable of testing accurately the strength of a horse-hair or a steel bar requiring an eight-hundred-thousand pound load to break. It is the prototype of a long line of hydraulic testing machines that have since been developed.

✦ ✦ ✦

COILS of heavy square wire are wrapped around Army fragmentation bombs that are used by low-flying airplanes against enemy infantry. When the bomb strikes, the explosions rips the wrapping into bits and sends them zinging out in all directions like so many bullets.

✦ ✦ ✦

SPECIAL abrasive blasting machines make it possible to clean millions of metal belt links for Army caliber .30 and caliber .50 machine gun cartridges quickly and cheaply. In a few minutes, 20,000 caliber .30 or 5,000 caliber .50 links can be cleaned at a cost of 12 cents.

✦ ✦ ✦

Wire Rope Conservation Bulletins Available in Pamphlet Form

IN response to many requests for their series of Wire Rope Conservation Bulletins, Macwhyte Company announces that this is now available in pamphlet form for wire rope users.

✦ ✦ ✦

COPIES may be had by requesting pamphlet #43-85 on company letterhead to Macwhyte Company, Kenosha, Wisconsin.

Manufacturers of
MUSIC WIRE
AIRCRAFT CABLE WIRE
STAINLESS STEEL — HIGH CARBON
SILVER NICKEL — WELDING WIRE
STRAIGHTENING & CUTTING TO LENGTH
RE-DRAWING ALL KINDS OF WIRE
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SLEEPER & HARTLEY, Inc.
Designers and Builders
SPRING COILERS
WIRE WORKING MACHINERY
WIRE MILL EQUIPMENT
SPECIAL MACHINERY
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SCOTT TESTERS
*Registered Trademark
60 Models for WIRE, RUBBER, TEXTILES, PAPER, ETC.
HENRY L. SCOTT CO.
55 Blackstone St. Providence, R. I.
Standard of the World

WIRE MACHINERY SPECIALISTS
3—Nilson No. 1, 3 & 4 4 Slide Wire Machines
5—Baird No. 4—Four Slide Wire Machines
7—Waterbury Step Cone Wire Drawing Machines
1—Two Spindle Bull Block Motor Driven
6—Lewis Welding Wire S. & C. Machines M. D.
2—Shuster Shaped Wire S. & C. Machines ½" & ⅞" Square, Hexagon & Round Stock Capacities
8—Shuster Round Wire Straightening & Cutting Machines 1/32"-½"
Wanted: Tack Making Machinery. All Sizes.
NATIONAL MACHINERY EXCHANGE
128-138 MOTT ST. NEW YORK, N. Y.

WIRE DRAWING COMPOUNDS
Magnus Wire Drawing Compounds help to speed production, cut costs and improve quality. They cover the entire range of wire drawing—wet, dry and grease drawing, on ferrous and non-ferrous wire. Write for your copy of the Magnus Drawing Lubricants bulletin.
MAGNUS CHEMICAL COMPANY, 188 South Ave., Garwood, N. J.

EYELETS
ZINC WIRE
ZINC STRIP
THE PLATT BROS. & CO.
WATERBURY, CONN.

Designers and Builders of Gas-Fired Heat Treating Furnaces for Ferrous and Non-Ferrous Wire.
SURFACE COMBUSTION
Main Plant & General Offices - Toledo, Ohio

RUESCH
Machinery For
Wire, Tube, and Brass Mills
409 Mulberry St., Newark, N. J.

WIRE DRAWING MACHINERY AND EQUIPMENT
Rod Frames — 16" Frames, 8" Frames — Take-Up Frames, Wire Pointers — Puller Tongs.
General and heat resisting alloy castings for wire mill use.
Circulars on Request.
E. J. SCUDDER FOUNDRY & MACHINE CO.
TRENTON, N. J.

APCO MOSSBERG CO.
the original Frank Mossberg Co.
Manufacturers of Reels and Spools
Attleboro, Mass.

WIRE MILL FURNACES FUEL & ELECTRIC
For Rolling and Annealing
Ferrous and Non-Ferrous Metals
W. S. ROCKWELL Co.
50 Church St. New York 7, N. Y.

Annealing Pots and Boxes
Galvanizing Kettles
Lead and Spelter Pans
Pressure Vessels
NATIONAL ANNEALING BOX CO.
Established 1895
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Specify SAUEREISEN
ACIDPROOF CEMENTS—COMPOUNDS
FOR
Tanks, Sewers, Stacks, Floors
Technical cements for all purposes.
Send sketches or samples
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Incorporate Cutting Tool Manufacturers Association

ARTICLES of Incorporation for the Cutting Tool Manufacturers Association, a non-profit corporation, have been filed in Wilmington, Delaware, according to **W. G. Robbins,** Chairman of the Board of Directors elected at the December 10th organization meeting in Detroit.

\+ + +

AMONG the purposes of the Association are assistance to not only the cutting tool industry but also Federal and local agencies on such subjects as renegotiation, taxes, contract cancellation and termination, disposal of surplus cutting tools by the Armed services, standardization of cutting tools to permit greater simplification of production equipment and methods, problems arising from cancellation, etc., of pool orders and post-war disposal of emergency manufacturing facilities.

\+ + +

Facts About the Beryllium Copper Supply

A FOLDER, recently published by Instrument Specialties Co., sets forth the facts about the supply of Beryllium Copper in contrast to the widely misleading story which appeared nationally in the newspress on the discovery of a "mountain of Beryllium Copper" in Southern Oregon.

\+ + +

THE folder, "Spiking A Rumor," analyzes the present status and the future prospects of the Beryllium Copper supply and mentions the methods that this company, manufacturers of Beryllium Copper Springs, has used to meet deliveries.

\+ + +

A COPY of the folder may be had by writing Instrument Specialties Co., Inc., Little Falls, N. J.

WATERPROOF
and
CREPE PAPER
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WHERE TO BUY

For more complete information, consult the annual Wire and Wire Products Directory, Index & Buyers' Guide.

ABRASIVES—
Norton Co., Worcester, Mass.

ACID INHIBITORS—
American Chemical Paint Co., Ambler, Pa.

ACID-PROOF CONSTRUCTION—
Ceilcote Co., The, Cleveland, Ohio

AIR DRAW FURNACES—
Carl-Mayer Corp., The, Cleveland, Ohio.

ALKALINE CLEANERS—
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.

ANNEALING MACHINES—Open Flame
Syncro Machine Co., Rahway, N. J.

ANNEALING POTS AND BOXES—
National Annealing Box Co., Washington, Penna.
Scudder, E. J., Foundry & Machine Co., Trenton, N. J.

ARMORING EQUIPMENT—
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.
Watson Machine Co., Paterson, N. J.

BAKERS—Flash
Morrison Engr. Corp., Cleveland, Ohio

BAKERS—Hi-Speed
Carl-Mayer Corp., The, Cleveland, Ohio.

BAKERS—Rod and Wire
Carl-Mayer Corp., The, Cleveland, Ohio.
Morgan Construction Co., Worcester, Mass.
Morrison Engr. Corp., Cleveland, Ohio
Moslo Machinery Co., Cleveland, Ohio.
Ross, J. O., Engineering Corp., New York, N. Y.

BENDERS—
O'Neil-Irwin Mfg. Co., Minneapolis, Minn.

BOBBINS—Braider and Wire Weaving
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Co., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.

BORON CARBIDE—
Norton Co., Worcester, Mass.

BRAKES & SHEARS—
O'Neil-Irwin Mfg. Co., Minneapolis, Minn.

BRICKS—Acid Proof
Keagler Brick Co., Steubenville, Ohio.

CABLE LACQUERING OVENS
Industrial Oven Engr. Co., Cleveland, Ohio.

CABLE—Steel and Copper
Brewer Mfg. Co., Muncy, Pa.

CARRIERS—Braider, High Speed
Apco Mossberg Co., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.
New England Butt Co., Providence, R. I.

CASTINGS—Wire Mill
Scudder, E. J., Fdry. & Machine Co., Trenton, N. J.

CEMENTS—Acid Proof
Sauereisen Cement Co., Pittsburgh, Pa.

CEMENTS—Refractory
Norton Co., Worcester, Mass.

CHEMICALS—Cleaning
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Oakite Products, Inc., New York, N. Y.
Standard Industrial Compounds Co., Chicago, Ill.

CLEANERS—Hand and Metal
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Magnus Chemical Co., Garwood, N. J.
Oakite Products, Inc., New York, N. Y.
Standard Industrial Compounds Co., Chicago, Ill.

CLEANING & PICKLING EQUIPMENT—
Broden Construction Co., Cleveland, O.
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, Ohio.
Haveg Corporation, Newark, Del.
Morgan Construction Co., Worcester, Mass.
Nukem Products Corp., Buffalo, N. Y.
Vaughn Machinery Co., Cuyahoga Falls, O.
Wilson, Lee, Engr. Co., Cleveland, Ohio

CLOTH TESTERS—
Scott, Henry L., Co., Providence, R. I.

CLOTH—Wire, All Metals
Callite Tungsten Corp., Union City, N. J.
Roebling's, John A., Sons, Co., Trenton, N. J.

COATING COMPOUNDS—
Apex Alkali Products Co., Philadelphia, Pa.
Gilron Products Co., Cleveland, Ohio
Standard Industrial Compounds Co., Chicago, Ill.

COILERS—Sheet, Strip and Wire
Broden Construction Co., Cleveland, O.
Ruesch, H. J., Machine Co., Newark, N. J.
Torrington Mfg. Co., Torrington, Conn.

COLD HEADERS—
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

COMPOUNDS—Coppering
American Chemical Paint Co., Ambler, Pa.

COMPOUNDS—Metal Finishing
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.

COMPOUNDS—Rust Preventing
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.

COMPOUNDS—Rust Removing
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.

COMPOUNDS—Wire Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Gilron Products Co., Cleveland, Ohio.
Oakite Products, Inc., New York, N. Y.
Standard Industrial Compounds Co., Chicago, Ill.

CONTROLS—Heat Treating
Niagara Blower Co., Buffalo, N. Y.

CONTROLS—Temperature
Niagara Blower Co., Buffalo, N. Y.

COPHOLDERS—Steel
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Co., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.

CRANES—Wire Mill
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, Ohio.
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

CUTTING TOOLS—Carbide
Carboloy Co., Inc., Detroit, Mich.
Firth-Sterling Steel Co., McKeesport, Pa.
Vascoloy-Ramet Corp., North Chicago, Ill.

CUTTING TOOLS—Wire
Porter, H. K., Inc., Everett, Mass.

DIAMONDS—Industrial
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N. J.
Callite Tungsten Corp., Union City, N. J.
Michigan Wire Die Co., Detroit, Mich.
Rusch Wire Die Corp., New York, N. Y.
Vianney Wire Die Wks., New York, N. Y.

DIAMOND POWDERS—
Michigan Wire Die Co., Detroit, Mich.
Rusch Wire Die Corp., New York, N. Y.

DIAMOND TOOLS—
Rusch Wire Die Corp., New York, N. Y.

DIE MAKING MACHINERY — For Forming Special Shapes
O'Neil-Irwin Mfg. Co., Minneapolis, Minn.

DIES—Diamond
Ajax Industrial Supplies, Inc., Fort Wayne, Ind.
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N. J.
Cochaud Wire Die Corp., New York, N. Y.
Fort Wayne Wire Die, Inc., Fort Wayne, Ind.
Indiana Wire Die Co., Fort Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Luginbill Wire Die Co., Fort Wayne, Ind.
Michigan Wire Die Co., Detroit, Mich.
Rusch Wire Die Corp., New York, N. Y.
Vianney Wire Die Works, New York, N. Y.
Wayne Wire Die Co., Hillside, N. J.

DIES—Lead Extrusion
Robertson, John, Co., Brooklyn, N. Y.

DIES—Repairs & Re-Cutting
Ajax Industrial Supplies Co., Fort Wayne, Ind.
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N. J.
Carboloy Co., Inc., Detroit, Mich.
Cochaud Wire Die Corp., New York, N. Y.
Firth-Sterling Steel Co., McKeesport, Pa.
Fort Wayne Wire Die, Inc., Fort Wayne, Ind.
Indiana Wire Die Co., Fort Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Luginbill Wire Die Co., Fort Wayne, Ind.
Michigan Wire Die Co., Detroit, Mich.
Rusch Wire Die Corp., New York, N. Y.
Vascoloy-Ramet Corp., North Chicago, Ill.
Vianney Wire Die Works, New York, N. Y.
Wayne Wire Die Co., Hillside, N. J.
Willey's Carbide Tool Co., Detroit, Mich.

DIES—Rod and Tube Drawing
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N. J.
Carboloy Co., Inc., Detroit, Mich.
Firth-Sterling Steel Co., McKeesport, Pa.
Kelly Wire Die Corp., New York, N. Y.
Michigan Wire Die Co., Detroit, Mich.
Rusch Wire Die Corp., New York, N. Y.
Tungsten Electric Corp., Union City, N. J.
Vascoloy-Ramet Corp., North Chicago, Ill.
Vianney Wire Die Works, New York, N. Y.
Willey's Carbide Tool Co., Detroit, Mich.

DIES—Tantalum Carbide
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N. J.
Carboloy Co., Inc., Detroit, Mich.
Firth-Sterling Steel Co., McKeesport, Pa.
Kelly Wire Die Corp., New York, N. Y.
Rusch Wire Die Corp., New York, N. Y.
Vascoloy-Ramet Corp., North Chicago, Ill.
Vianney Wire Die Works, New York, N. Y.
Willey's Carbide Tool Co., Detroit, Mich.

DIES—Tungsten Carbide
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N. J.
Carboloy Co., Inc., Detroit, Mich.
Firth-Sterling Steel Co., McKeesport, Pa.
Kelly Wire Die Corp., New York, N. Y.
Michigan Wire Die Co., Detroit, Mich.
Rusch Wire Die Corp., New York, N. Y.
Tungsten Electric Corp., Union City, N. J.
Vascoloy-Ramet Corp., North Chicago, Ill.
Vianney Wire Die Works, New York, N. Y.
Willey's Carbide Tool Co., Detroit, Mich.
Wopis Industry Laboratory, Brooklyn, N. Y.

DIRECT ELECTRIC RESISTANCE HEATING—
Trauwood Engr. Company, Cleveland, Ohio

DRAW BENCHES—
Ruesch, H. J., Machine Co., Newark, N. J.
Scudder, E. J., Foundry & Machine Co., Trenton, N. J.
Standard Machinery Co., Providence, R. I.
Vaughn Machinery Co., Cuyahoga Falls, O.

DRUMS—Flange Steel
Stevens Metal Products Co., Niles, O.

DRUMS—Vulcanizing
Mossberg Pressed Steel Corp., Attleboro, Mass.

DRYING AND PRE-HEATING ROOMS—
Industrial Oven Engr. Co., Cleveland, O.

DRYING EQUIPMENT—
Ross, J. O., Engr. Corp., New York, N. Y.

ENGINEERS—Consulting Wire Mill
Hartley, George D., Worcester, Mass.
Lewis, Kenneth B., Worcester, Mass.

EQUIPMENT—Insulation Testing
Davis, R. L., Electric Co., Wallingford, Conn.

EYELETS—Brass or Zinc
Platt Bros. & Co., The, Waterbury, Conn.

FLASH BAKER—
Morrison Engr. Corp., Cleveland, Ohio

FLUXES—Soldering
American Chemical Paint Co., Ambler, Pa.

FOAM PRODUCING COMPOUNDS—
American Chemical Paint Co., Ambler, Pa.

FRICTION PAY-OFF STANDS—
Industrial Oven Engr. Co., Cleveland, O.

FURNACES—Annealing
Carl-Mayer Corp., The, Cleveland, Ohio.
Electric Furnace Co., Salem, O.
Morrison Engr. Corp., Cleveland, Ohio
Rockwell, W. S., Co., New York, N. Y.
Surface Combustion, Div. of General Properties Co., Inc., Toledo, Ohio.
Trauwood Engr. Company, Cleveland, Ohio
Wilson, Lee, Engr. Co., Cleveland, Ohio

WHERE TO BUY, Continued

FURNACES—Automatic
Carl-Mayer Corp., The, Cleveland, Ohio.
Electric Furnace Co., Salem, O.
Morrison Engr. Corp., Cleveland, Ohio
Rockwell, W. S., Co., New York, N. Y.
Surface Combustion, Div. of General Properties Co., Inc., Toledo, Ohio.
Wilson, Lee, Engr. Co., Cleveland, Ohio

FURNACES—Brazing
Electric Furnace Co., Salem, O.
Firth-Sterling Steel Co., McKeesport, Pa.

FURNACES—Bright Annealing
Electric Furnace Co., Salem, O.
Rockwell, W. S., Co., New York, N. Y.
Surface Combustion, Div. of General Properties Co., Inc., Toledo, Ohio.
Wilson, Lee, Engr. Co., Cleveland, Ohio

FURNACES—Electric
Electric Furnace Co., Salem, Ohio
Rockwell, W. S., Co., New York, N. Y.
Surface Combustion, Div. of General Properties Co., Inc., Toledo, Ohio
Trauwood Engr. Co., Cleveland, Ohio

FURNACES—Hardening & Tempering
Carl-Mayer Corp., The, Cleveland, Ohio
Electric Furnace Co., Salem, Ohio
Morrison Engr. Corp., Cleveland, Ohio
Rockwell, W. S., Co., New York, N. Y.
Surface Combustion, Div. of General Properties Co., Inc., Toledo, Ohio
Trauwood Engr. Co., Cleveland, Ohio

FURNACES—Lead Melting
Electric Furnace Co., Salem, Ohio
Robertson, John, Co., Brooklyn, N. Y.
Rockwell, W. S., Co., New York, N. Y.
Surface Combustion, Div. of General Properties Co., Inc., Toledo, Ohio

FURNACES—Non-Oxidizing
Carl-Mayer Corp., The, Cleveland, Ohio
Electric Furnace Co., Salem, Ohio
Morrison Engr. Corp., Cleveland, Ohio
Rockwell, W. S., Co., New York, N. Y.
Surface Combustion, Div. of General Properties Co., Inc., Toledo, Ohio

FURNACES—Normalizing
Carl-Mayer Corp., The, Cleveland, Ohio
Electric Furnace Co., Salem, Ohio
Morrison Engr. Corp., Cleveland, Ohio
Rockwell, W. S., Co., New York, N. Y.
Surface Combustion, Div. of General Properties Co., Inc., Toledo, Ohio.

FURNACES—Salt Bath
Electric Furnace Co., Salem, Ohio
Surface Combustion, Div. of General Properties Co., Inc., Toledo, Ohio.

FURNACES—Wire, Strip & Sheet
Carl-Mayer Corp., The, Cleveland, Ohio
Electric Furnace Co., Salem, Ohio
Morrison Engr. Corp., Cleveland, Ohio
Rockwell, W. S., Co., New York, N. Y.
Surface Combustion, Div. of General Properties Co., Inc., Toledo, Ohio.
Wilson, Lee, Engr. Co., Cleveland, Ohio

GALVANIZING EQUIPMENT—
Wilson, Lee, Engr. Co., Cleveland, Ohio

GALVANIZING KETTLES—
National Annealing Box Co., Washington, Penna.

GRINDERS—Roll
Norton Co., Worcester, Mass.

HI-SPEED BAKERS—
Carl-Mayer Corp., The, Cleveland, Ohio

HOISTS—Electric Travelling
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, O.

INHIBITORS—
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.

INSULATION LACQUERING SYSTEMS—Continuous
Industrial Oven Engr. Co., Cleveland, O.

KETTLES—Galvanizing, Annealing, Tinning, etc.
National Annealing Box Co., Washington, Penna.

LATHES—Die Reaming
Carboloy Co., Inc., Detroit, Mich.
Firth-Sterling Steel Co., McKeesport, Pa.
Morgan Construction Co., Worcester, Mass.
Roos, H. & G., Tool & Mfg. Co., Montclair, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry & Machine Co., Waterbury, Conn.

LIME—
Warner Company, Philadelphia, Pa.

LININGS—Acid and Alkali Proof
Ceilcote Co., The, Cleveland, Ohio

LUBRICANTS—For Metal Cutting, Stamping and Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Magnus Chemical Co., Garwood, N. J.
Standard Industrial Compounds Co., Chicago, Ill.

LUBRICANTS—Wire Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Bick, Hans C., Inc., Reading, Pa.
Magnus Chemical Co., Garwood, N. J.
Oakite Products, Inc., New York, N. Y.
Standard Industrial Compounds Co., Chicago, Ill.

MACHINERY—Armoring (Cable, Wire Hose)
American Insulating Mach'y. Co., Phila., Pa.
Fidelity Machine Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Robertson, John, Co., Brooklyn, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Braiding
Fidelity Machine Co., Philadelphia, Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Brazing
Syncro Machine Co., Rahway, N. J.

MACHINERY—Bunching
American Insulating Mach'y. Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Bundling, Scrap
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
Watson Machine Co., Paterson, N. J.

MACHINERY—Cable, Electric
American Insulating Mach'y. Co., Phila., Pa.
Fidelity Machine Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Chain Making
Nilson, A. H., Machine Co., The, Bridgeport, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Closing
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Coil Winding
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.

MACHINERY—Coilers
Broden Construction Co., Cleveland, Ohio
Morgan Construction Co., Worcester, Mass.
New England Butt Co., Providence, R. I.
Ruesch, H. J., Machine Co., Newark, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.
Torrington Mfg. Co., Torrington, Conn.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Copper Wire Drawing and Rolling
American Insulating Machy. Co., Philadelphia, Pa.
Ruesch, H. J., Machine Co., Newark, N. J.
Syncro Machine Co., Rahway, N. J.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Covering Wire
American Insulating Machy. Co., Philadelphia, Pa.
Fidelity Machine Co., Philadelphia, Pa.
Syncro Machine Co., Rahway, N. J.

MACHINERY—Cutting
Broden Construction Co., Cleveland, Ohio
Lewis Machine Co., The, Cleveland, Ohio
Moslo Machinery Inc., Cleveland, Ohio.
National Machinery Exchange (Used), New York, N. Y.
Nilson, A. H., Machine Co., The, Bridgeport, Conn.
Porter, H. K., Inc., Everett, Mass.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.
Torrington Mfg. Co., Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Die Making
Firth-Sterling Steel Co., McKeesport, Pa.
Roos, H. & G., Tool & Mfg. Co., Montclair, N. J.

MACHINERY — Die Making for Forming Special Shapes
O'Neil-Irwin Mfg. Co., Minneapolis, Minn.

MACHINERY—Draw Benches
Broden Construction Co., Cleveland, Ohio.
Morgan Construction Co., Worcester, Mass.
Ruesch, H. J., Machine Co., Newark, N. J.
Standard Machinery Co., Providence, R. I.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Edging
Broden Construction Co., Cleveland, Ohio.
Standard Machinery Co., Providence, R. I.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Enameling
American Insulating Mach'y. Co., Phila., Pa.
Syncro Machine Co., Rahway, N. J.

MACHINERY—Extruding
Robertson, John, Co., Brooklyn, N. Y.
Royle, John, & Sons, Paterson, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Flat Wire
Broden Construction Co., Cleveland, Ohio
Ruesch, H. J., Machine Co., Newark, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Forming
National Machinery Exchange (Used), New York, N. Y.
Nilson, A. H., Machine Co., The, Bridgeport, Conn.
O'Neil-Irwin Mfg. Co., Minneapolis, Minn.
Sleeper & Hartley, Inc., Worcester, Mass.
Standard Machinery Co., Providence, R. I.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Galvanizing
Wilson, Lee, Engr. Co., Cleveland, Ohio

MACHINERY—Galvanizing Wire
Broden Construction Co., Cleveland, O.
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
Wilson, Lee, Engr. Co., Cleveland, Ohio

MACHINERY—Gang Winders
Fidelity Machine Co., Philadelphia, Pa.
Robinson Mfg. Co., Muncy, Pa.
Ruesch, H. J., Machine Co., Newark, N. J.
Syncro Machine Co., Rahway, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Grinding
Norton Co., Worcester, Mass.

MACHINERY—Hydraulic Test—
Riehle Testing Machine Div. of American Machine and Metals, Inc., East Moline, Ill.

MACHINERY—Insulating
American Insulating Mach'y Co., Phila., Pa.
Fidelity Machine Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Royle, John, & Sons, Paterson, N. J.
Syncro Machine Co., Rahway, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Knitting
Fidelity Machine Co., Philadelphia, Pa.

MACHINERY—Lead Encasing Presses, etc.
Robertson, John, Co., Brooklyn, N. Y.

MACHINERY—Lead Stripping
Robertson, John, Co., Brooklyn, N. Y.
Watson Machine Co., Paterson, N. J.

MACHINERY—Lock Washer
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Magnet Wire
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Material Handling
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, Ohio.

WHERE TO BUY, Continued

MACHINERY — Measuring Wire & Cable
Davis, R. L., Electric Co., Wallingford, Conn.
Durant Mfg. Co., Milwaukee, Wis.
Lyon-Vail Machine Co., Brockton, Mass.
New England Butt Co., Providence, R. I.
Syncro Machine Co., Rahway, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Nail and Tack
Broden Construction Co., Cleveland, Ohio.
Glader, Wm., Machine Works, Chicago, Ill.
National Machinery Exchange (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Panning
American Insulating Mach'y Co., Phila., Pa.
Syncro Machine Co., Rahway, N. J.

MACHINERY—Pointing
Broden Construction Co., Cleveland, Ohio
Morgan Construction Co., Worcester, Mass.
Ruesch, H. J., Machine Co., Newark, N. J.
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Standard Machinery Co., Providence, R. I.
Syncro Machine Co., Rahway, N. J.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Quill Winding
Fidelity Machine Co., Philadelphia, Pa.

MACHINERY—Rod Mill
Broden Construction Co., Cleveland, Ohio
Morgan Construction Co., Worcester, Mass.
Ruesch, H. J., Machine Co., Newark, N. J.

MACHINERY—Rolling Mill
Broden Construction Co., Cleveland, Ohio
Morgan Construction Co., Worcester, Mass.
National Machinery Exchange (Used), New York, N. Y.
Ruesch, H. J., Machine Co., Newark, N. J.
Standard Machinery Co., Providence, R. I.
Syncro Machine Co., Rahway, N. J.
Torrington Mfg. Co., Torrington, Conn.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Rubber for Insulating Wire
Royle, John, & Sons, Paterson, N. J.

MACHINERY—Rubber Strip Covering
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Rubber Tubing and Straining
New England Butt Co., Providence, R. I.
Royle, John, & Sons, Paterson, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Screw Wire
National Machinery Exchange (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Special
American Insulating Mach'y Co., Phila., Pa.
Broden Construction Co., Cleveland, Ohio
Emory, Robert J., Co., Newark, N. J.
New England Butt Co., Providence, R. I.
Ruesch, H. J., Machine Co., Newark, N. J.
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Standard Machinery Co., Providence, R. I. (Special Designs)
Syncro Machine Co., Rahway, N. J.
Torrington Mfg. Co., Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Spooling
American Insulating Mach'y Co., Phila., Pa.
Emory, Robert J., Co., Newark, N. J.
Fidelity Machine Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Spring Making
National Machinery Exchange (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Staple
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Straightening
Broden Construction Co., Cleveland, Ohio
Lewis Machine Co., The, Cleveland, Ohio
Moslo Machinery Co., Cleveland, Ohio
National Machinery Exchange (Used), New York, N. Y.
Nilson, A. H., Machine Co., The, Bridgeport, Conn.
Ruesch, H. J., Machine Co., Newark, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Stranding
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Strip Steel
Broden Construction Co., Cleveland, Ohio
Ruesch, H. J., Machine Co., Newark, N. J.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Swaging
National Machinery Exchange (Used), New York, N. Y.
Ruesch, H. J., Machine Co., Newark, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Standard Machinery Co., Providence, R. I.
Syncro Machine Co., Rahway, N. J.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Taping
American Insulating Mach'y Co., Phila., Pa.
Fidelity Machine Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Syncro Machine Co., Rahway, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Testing
Riehle Testing Machine Div. of American Machine and Metals, Inc., East Moline, Ill.
Scott, Henry L., Co., Providence, R. I.

MACHINERY—Testing Size of Wire
Davis, R. L., Electric Co., Wallingford, Conn.

MACHINERY—Testing Spring
Standard Machinery Co., Providence, R. I.

MACHINERY—Tinsel Rolling Mills
American Insulating Mach'y Co., Phila., Pa.
Syncro Machine Co., Rahway, N. J.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Trolley Wire
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Tube Mill
Ruesch, H. J., Machine Co., Newark, N. J.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Welding Wire
Micro Products Co., Chicago, Ill.
Syncro Machine Co., Rahway, N. J.

MACHINERY—Winding
American Insulating Mach'y Co., Phila., Pa.
Fidelity Machine Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.
Torrington Mfg. Co., Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Wind-up (Constant Tension, Variable Speed)
Industrial Oven Engr. Co., Cleveland, O.

MACHINERY—Wire Bending
O'Neil-Irwin Mfg. Co., Minneapolis, Minn.

MACHINERY—Wire Drawing
American Insulating Mach'y Co., Phila., Pa.
Broden Construction Co., Cleveland, Ohio
Morgan Construction Co., Worcester, Mass.
National Machinery Exchange (Used), New York, N. Y.
Ruesch, H. J., Machine Co., Newark, N. J.
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Standard Machinery Co., Providence, R. I.
Syncro Machine Co., Rahway, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Wire Measuring
Durant Mfg. Co., Milwaukee, Wis.
Lyon-Vail Machine Co., Inc., Brockton, Mass.
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Wire Rope
New England Butt Co., Providence, R. I.
Syncro Machine Co., Rahway, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Wire Tinning
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Syncro Machine Co., Rahway, N. J.

MACHINERY—Wood Screw
National Machinery Exchange (Used), New York, N. Y.

MATERIAL HANDLING EQUIPMENT
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, O.

MILLS—Tandem Rolling and Edging
Standard Machinery Co., Providence, R. I.
Torrington Mfg. Co., Torrington, Conn.

NAILS—
Wickwire Bros., Inc., Cortland, N. Y.

NICKEL SILVER AND PHOSPHOR BRONZE—Rod, Wire and Strip
Hudson Wire Co., Ossining, N. Y.

OILS—Wire Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Standard Industrial Compounds Co., Chicago, Ill.

OVENS—Cable Lacquering
Industrial Oven Engr. Co., Cleveland, Ohio

OVENS—Dehydrogenizing
Industrial Oven Engr. Co., Cleveland, O.

OVENS—Industrial
Carl-Mayer Corp., The, Cleveland, Ohio
Industrial Oven Engr. Co., Cleveland, Ohio
Morrison Engr. Corp., Cleveland, Ohio
Ross, J. O., Engineering Corp., New York, N. Y.

OVENS—Welding Rod Coating
Industrial Oven Engr. Co., Cleveland, O.

PAINTS—Heat Resisting
American Chemical Paint Co., Ambler, Pa.

PAINTS—Marine
American Chemical Paint Co., Ambler, Pa.

PAINTS—Structural Steel
American Chemical Paint Co., Ambler, Pa.

PANS—Lead and Spelter
National Annealing Box Co., Washington, Penna.

PANS—Vulcanizing
Mossberg Pressed Steel Corp., Attleboro, Mass.

PAPER—Creped Wrapping
Crepe-Kraft Co., Newark, N. J.

PAPER TESTERS—
Scott, Henry L., Co., Providence, R. I.

PATENT ATTORNEYS—
Lancaster, Allwine and Rommel, Washington, D. C.

PAY-OFF STAND—Constant Tension
Cook Engineering Co., Prospect Park, N. J.

PICKLING COMPOUNDS—
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.

PICKLING TANK LININGS—
Keagler Brick Co., Steubenville, Ohio.
Sauereisen Cement Co., Pittsburgh, Pa.

PIPES AND FITTINGS—Acid Resistant
Haveg Corp., Newark, Del.

PLASTIC TESTERS—
Scott, Henry L., Co., Providence, R. I.

POTS—Lacquer
Industrial Oven Engr. Co., Cleveland, O.

POTS—Lead Melting
Robertson, John, Co., Brooklyn, N. Y.

POWDER—Wire Drawing
Apex Alkali Products Co., Philadelphia, Pa.

PRESSES—Hydraulic and Mechanical
Robertson, John, Co., Brooklyn, N. Y.
Standard Machinery Co., Providence, R. I. (Mechanical Only)

WHERE TO BUY, Continued

PRESSES—Lead
Robertson, John, Co., Brooklyn, N. Y.

PRESSURE VESSELS—
National Annealing Box Co., Washington, Penna.

PULLERS—Wire
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.

PUMPS—Hydraulic
Robertson, John, Co., Brooklyn, N. Y.

QUENCHING BATH CONTROLS—
Niagara Blower Co., Buffalo, N. Y.

REEL AND TENSION STAND—
Fidelity Machine Co., Philadelphia, Pa.
Moslo Machinery Co., Cleveland, Ohio
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.

REEL CRUTCHES—
Watson Machine Co., Paterson, N. J.

REELS—Annealing and Stranding
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Co., Chicago, Ill.
Moslo Machinery Co., Cleveland, Ohio
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Niles, O.

REELS—Steel
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Co., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Niles, O.

REELS AND SPOOLS—Shipping and Shop
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Co., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Niles, O.

REELS—Takeoff
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Co., Chicago, Ill.
Moslo Machinery Co., Cleveland, Ohio
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Niles, O.

REELS—Vulcanizing and Impregnating
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Co., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Niles, O.

REELS—Wire Drawing
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Co., Chicago, Ill.
Moslo Machinery Co., Cleveland, Ohio
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Niles, O.

REFRACTORIES—High Temperature
Norton Co., Worcester, Mass.

ROD BAKERS—
Carl-Mayer Corp., The, Cleveland, Ohio
Morrison Engr. Corp., Cleveland, Ohio
Moslo Machinery Co., Cleveland, Ohio
Ross, J. O., Engineering Corp., New York, N. Y.

RODS—Wire—Non-Ferrous
Hudson Wire Co., Ossining, N. Y.
Platt Bros. & Co., The, Waterbury, Conn.

RODS—Wire—Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Indiana.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Wickwire Spencer Steel Co., New York, N. Y.

ROLL STRAIGHTENERS—
Moslo Machinery Co., Cleveland, Ohio

ROPE—Wire
Bethlehem Steel Co., Bethlehem, Pa.
Brewer Mfg. Co., Muncy, Pa.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Roebling's, John A., Sons, Co., Trenton, N. J.

RUBBER AND RUBBER COMPRESSION TESTERS—
Scott, Henry L., Co., Providence, R. I.

RUST PROOF COMPOUNDS—
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.

RUST REMOVING COMPOUNDS—
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.

SATURATION SYSTEMS—
Industrial Oven Engr. Co., Cleveland, O.

SHEARS—
O'Neil-Irwin Mfg. Co., Minneapolis, Minn.

SHEET—Steel
Continental Steel Corp., Kokomo, Ind.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.

SOAPS—Industrial and Wire Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Magnus Chemical Co., Garwood, N. J.
Standard Industrial Compounds Co., Chicago, Ill.

SOLVENT RESIN SYSTEMS—Experimental
Industrial Oven Engr. Co., Cleveland, O.

SPOOLS—Annealing and Wire Drawing
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Co., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Niles, O.

SPOOLS—Shipping and Shop
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Co., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Niles, O.

SPOOLS—Steel
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Co., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Niles, O.

STAMPINGS—Steel
Hubbard Spool Co., Chicago, Ill
Mossberg Pressed Steel Corp., Attleboro, Mass.

STRAND—Steel and Copper
Brewer Mfg. Co., Muncy, Pa.

STRIP—Brass and Non-Ferrous
Hudson Wire Co., Ossining, N. Y.

STRIP—Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Firth-Sterling Steel Co., McKeesport, Pa.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Roebling's, John A., Sons, Co., Trenton, N. J.

STRIP METAL TESTERS—
Scott, Henry L., Co., Providence, R. I.

SWIFTS—Take-off
Apco Mossberg Co., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.

TANK LININGS—Brick
Keagler Brick Co., Steubenville, Ohio.
Nukem Products Corp., Buffalo, N. Y.

TANKS—Compound
Watson Machine Co., Paterson, N. J.

TANKS—Pickling
Havez Corp., Newark, Del.
Nukem Products Corp., Buffalo, N. Y.
Sauereisen Cements Co., Pittsburgh, Pa.

TANKS—Steel
Mossberg Pressed Steel Corp., Attleboro, Mass.

TEMPERATURE CONTROLS—
Niagara Blower Co., Buffalo, N. Y.

TENSILE TESTERS—
Scott, Henry L., Co., Providence, R. I.

TESTING INSTRUMENTS—
Riehle Testing Machine Div. of American Machine and Metals, Inc., East Moline, Ill.
Scott, Henry L., Co., Providence, R. I.

TOOLS—Wire Cutting
Porter, H. K., Inc., Everett, Mass.

TRAMRAIL SYSTEMS—
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, O.

TREADS—Safety
Norton Co., Worcester, Mass.

TRUCKS—
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

TUBE BENDERS AND FORMERS—
Ruesch, H. J., Machine Co., Newark, N. J.

TURKS HEADS—Friction and Power Driven
Standard Machinery Co., Providence, R. I.

VALVES AND FITTINGS—Acid Resistant
Haveg Corp., Newark, Del.

VULCANIZERS—
Watson Machine Co., Paterson, N. J.

VULCANIZING PANS—
American Insulating Mach'y Co., Phila., Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.

WELDERS—Spot and Butt
Micro Products Co., Chicago, Ill.
Moslo Machinery Co., Cleveland, Ohio

WIND-UP AND UNWIND SYSTEMS—Continuous
Industrial Oven Engr. Co., Cleveland, O.

WIRE—Cold Heading
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Indiana.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.

WIRE—Electric
Callite Tungsten Corp., Union, City, N. J.
Hudson Wire Co., Ossining, N. Y.
Roebling's, John A., Sons Co., Trenton, N. J.

WIRE—Enameled for Coils
Winsted Div. of Hudson Wire Co., Winsted, Conn.

WIRE—Flat
Roebling's, John A., Sons, Co., Trenton, N. J.

WIRE—Manufacturers
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Firth-Sterling Steel Co., McKeesport, Pa.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Wickwire Bros., Inc., Cortland, N. Y.
Wickwire Spencer Steel Co., New York, N. Y.

WIRE—Music
Callite Tungsten Corp., Union City, N. J.
Jersey Steel & Wire Corp., Irvington, N. J.

WIRE—Nickel Silver and Phosphor Bronze
Callite Tungsten Corp., Union City, N. J.
Hudson Wire Co., Ossining, N. Y.

WIRE—Non-Ferrous to Specification for Special Purposes
Callite Tungsten Corp., Union City, N. J.
Hudson Wire Co., Ossining, N. Y.
Winsted Div. of Hudson Wire Co., Winsted, Conn.

WIRE—Spring
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Firth-Sterling Steel Co., McKeesport, Pa.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.

WIRE—Stainless Steel
Callite Tungsten Corp., Union City, N. J.
Firth-Sterling Steel Co., McKeesport, Pa.
Wickwire Spencer Steel Co., New York, N. Y.

WIRE—Steel—Also Coppered Steel—Also Galvanized Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Roebling's, John A., Sons Co., Trenton, N. J.
Wickwire Spencer Steel Co., New York, N. Y.

WIRE AND STRIP—Zinc
Platt Bros. & Co., The, Waterbury, Conn.

WIRE TESTERS—
Scott, Henry L., Co., Providence, R. I.

WIRE, WEAVING—Non-Ferrous
Hudson Wire Co., Ossining, N. Y.

WRAPPING PAPER—Creped
Crepe-Kraft Co., Newark, N. J.

YARN TESTERS—
Scott, Henry L., Co., Providence, R. I.

Custom built spools for high speed winding

Mercury testing for continuity of film

Checking raw materials

Don't "fool around"... USE DEPENDABLE WIRE PRODUCTS!

A product, too, is only as strong as its weakest part. Follow the practice of leading designers and engineers by specifying only service-giving wire . . . wire that has built up a reputation for "delivering the goods under fire."

Hudson Wire products, designed for discriminating manufacturers, has just such a reputation in the fine wire field. Offering greater flexibility and tensile strength, perfect laying at higher speeds, new coating methods and reduced coil dimensions without sacrificing electrical values, Hudson Wire products will probably lower your production costs considerably. Check these three points:

QUALITY — All phases of manufacture, from ingot to final processing, are carefully supervised and fulfilled in the same manner you would carry out in your own plant. There are no unimportant phases in the work.

UNIFORMITY — By mercury process tests, our engineers can guarantee perfect uniformity in wire; from the smallest to the largest order. No more variations in consistency, structure or electrical properties . . . every inch of wire exactly as specified, more than meeting your requirements.

SERVICE —If you have a wire problem, our complete design and engineering facilities are at your disposal without obligation. Send your specifications and blueprints for our recommendations; or if you are not quite ready, write for samples of these quality products.

Enameled Copper, Enameled Iron, Enameled Alloy, Enameled Aluminum, Silk Covered, Cotton Covered, Celanese Covered, Glass Fibre Covered, Twisted Multiples, Parallel Multiples and Litzendraht.

HUDSON WIRE CO.

Winsted Division

WINSTED CONNECTICUT

Some EF Gas Fired, Oil Fired and Electric Furnaces . . . Production Furnaces Engineered to Fit the Job

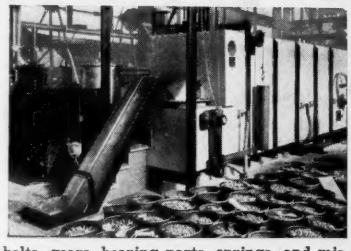
Roller Rail Pusher Furnaces

For annealing, heat treating, short cycle malleablizing, etc.

Used for handling miscellaneous products. The material is carried through the furnace in light baskets or trays. 40,000 pounds of malleable castings per day are annealed scale free in the above special atmosphere furnaces.

Chain Belt Conveyor Furnaces

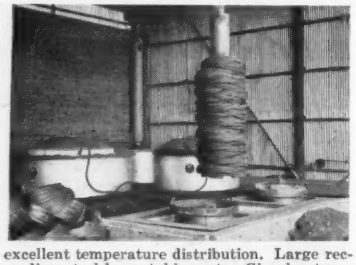
For continuous heat treating small and medium sized products



For scale free hardening bolts, gears, bearing parts, springs, and miscellaneous other products in quantities. Material is loaded directly on belt, carried through the furnace and automatically quenched or otherwise discharged.

Pit Type Furnaces

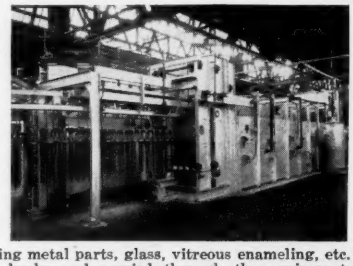
Rectangular, Circular or other types



An efficient furnace with excellent temperature distribution. Large rectangular pits are used for annealing steel bars, tubing, etc. Circular types for various ferrous and non-ferrous products. Above installation is annealing coiled wire, and normalizing rod.

Suspended Conveyor Furnaces

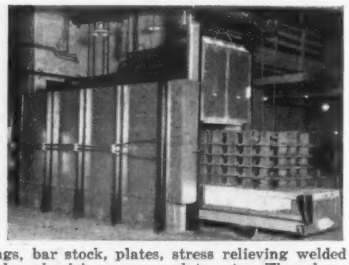
For handling various products and processes



For continuous heat treating metal parts, glass, vitreous enameling, etc. The work is suspended on hooks and carried through the equipment. The above installation is a continuous unit for hardening, drawing, and automatic quenching automobile axles.

Car Type Furnaces

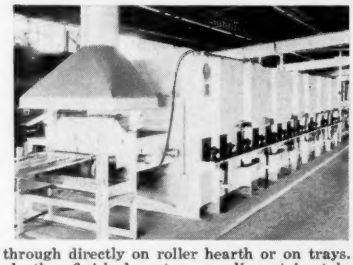
For annealing and various heat treating processes



Used for annealing castings, bar stock, plates, stress relieving welded structures, heat treating and carburizing armor plate, etc. The above single ended car type furnace is annealing steel castings. Car type furnaces may be built to handle any size product.

Roller Hearth Conveyor Furnaces

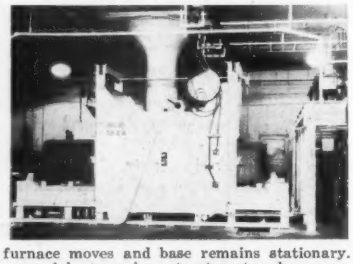
For hardening, annealing, copper brazing, etc.



The material is conveyed through directly on roller hearth or on trays. Used for hardening gears and other finished parts, annealing strip, tubing, castings, etc. Also for copper brazing, normalizing, and other processes. Above installation is bright annealing steel strip.

Reciprocating Type Furnaces

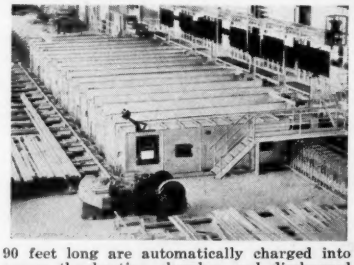
For nitriding and other special atmosphere treatments



Similar to car type but furnace moves and base remains stationary. Used for nitriding and other special atmosphere treatments where permanent connections to retorts are desired. Above furnace is nitriding aircraft engine parts.

Large Automatic Conveyor Hearth Types

For various heat treating processes and products

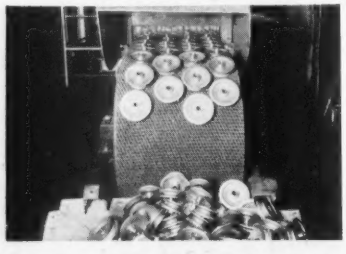


Structural shapes up to 90 feet long are automatically charged into the above furnace, carried across the heating chamber and discharged through a spray quench—everything is automatic. Uniform temperature is maintained throughout the 93 x 26-ft. heating chamber.

Mesh Belt Conveyor Furnaces

For copper brazing, drawing, etc.

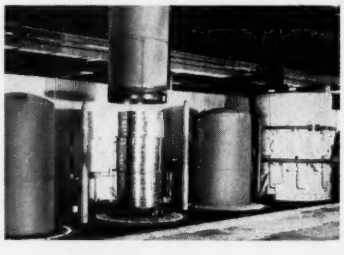
Material is loaded directly on belt. Above illustration shows discharge end of a continuous furnace copper brazing fan pulley assemblies. The completed unit is discharged securely joined, clean, and bright.



Bell or Hood Type Furnaces

For annealing wire, strip, nitriding, etc.

Charges are placed on fixed bases, furnace is placed in position by crane or hoist. Inner cover contains protective atmosphere. May have forced convection to promote speed of heating or temperature distribution. This installation is bright annealing steel strip.



Additional information on above or other types of EF production furnaces gladly sent on request.

The Electric Furnace Co., (Gas Fired, Oil Fired and Electric Furnaces) **Salem, Ohio**